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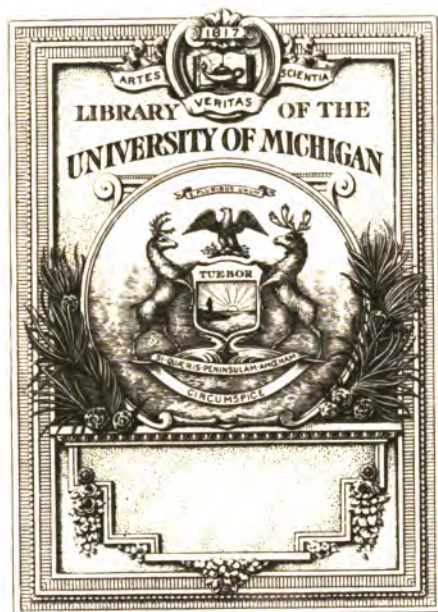
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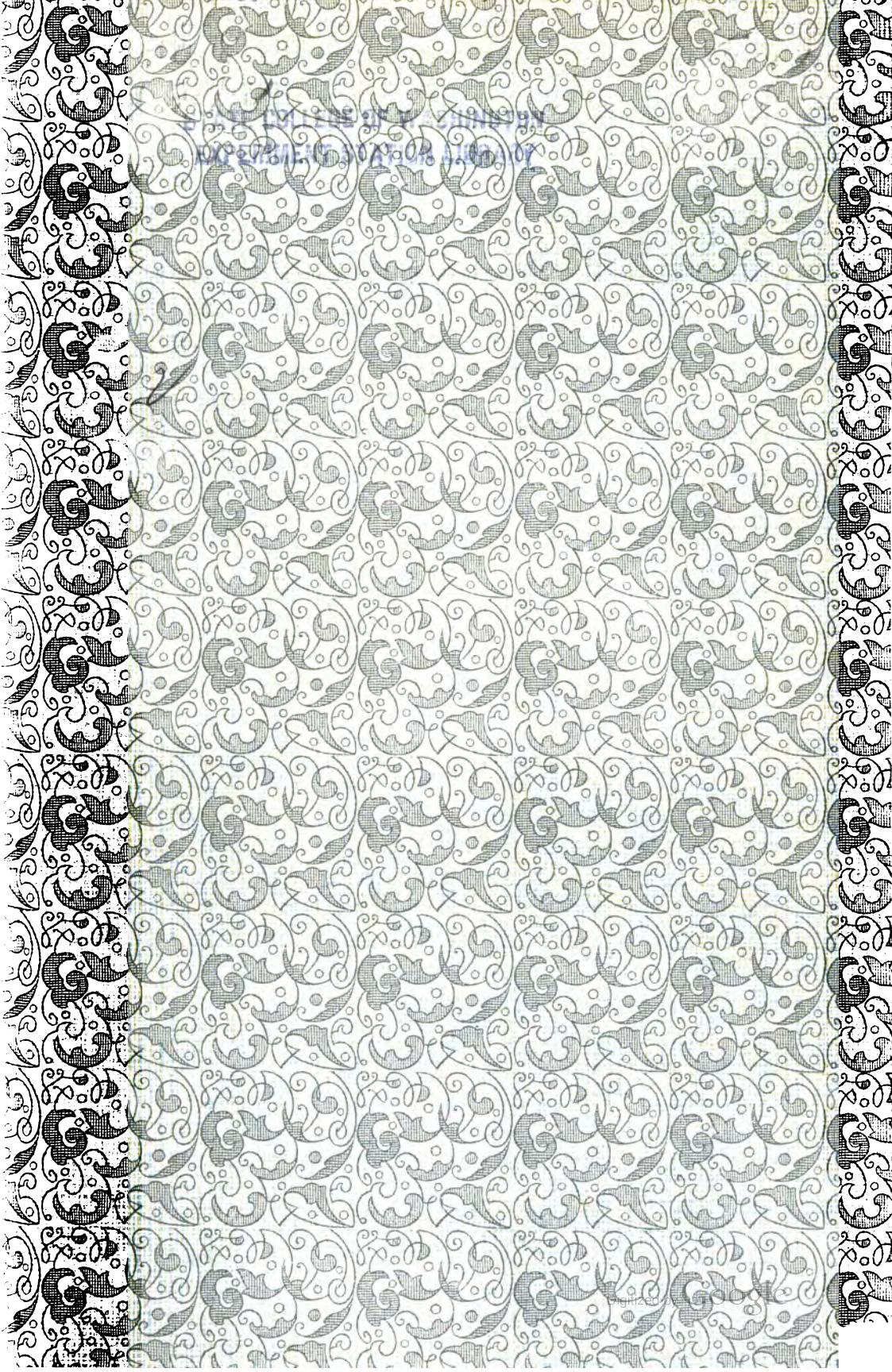
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STATE OF WASHINGTON

DEPARTMENT OF AGRICULTURE
THIRD BIENNIAL REPORT
1916-1918



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Third Biennial Report

OF THE

Washington (State)

Department of Agriculture

OF THE

LEGISLATIVE COUNCIL

State of Washington

TO THE

GOVERNOR

July 1, 1916, to June 30, 1918



OLYMPIA, WASH.

FRANK M. LAMBORN  PUBLIC PRINTER

1918

LETTER OF TRANSMITTAL.

STATE OF WASHINGTON,
DEPARTMENT OF AGRICULTURE.

Olympia, November 1, 1918.

To His Excellency, Ernest Lister, Governor.

Sir: Complying with the laws, I have the honor to submit herewith the Third Biennial Report of this Department, covering the period—July 1, 1916, to June 30, 1918.

Certain important subjects are brought down to date in the written portions; this information, together with all statistics concerning the period since June 30, 1918, will also be included in the next biennial report.

Respectfully submitted,

E. F. BENSON,
Commissioner of Agriculture.

Excl.

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ADVISORY BOARD.

Governor Ernest Lister, Chairman, Olympia, Washington.

Dr. Granville Lowther, Yakima, Washington.

Dr. Ira Cardiff, Pullman, Washington.

(Member until May, 1917.)

Acting Director Geo. Severance, Pullman, Washington.

(Member from and after May, 1917.)

Dr. H. T. Graves, Acting Commissioner, Olympia, Washington.

(Secretary until March 31, 1917.)

E. F. Benson, Commissioner, Olympia, Washington.

(Secretary from and after April 1, 1917.)

E. E. FLOOD, SPOKANE, BANKER--FARMER

DIVISION CHIEFS.

Dairy and Livestock Division.

Dr. H. T. Graves, Chief until April 30, 1917.

Dr. R. J. Donohue, Chief from and after May 1, 1917.

Horticultural Division.

T. O. Morrison, Chief until May 19, 1917.

M. L. Dean, Chief from and after May 26, 1917.

Division of Foods, Feeds, Fertilizers, Drugs, Oils and Bakery Inspection.

J. J. Higgins, Chief of Division until deceased August 3, 1917.

Will H. Adams, Chief of Division from and after August 4, 1917.

Chemists.

Prof. C. W. Johnson, Seattle, Washington.

Prof. George A. Olson, Pullman, Washington.

Miss M. Y. Orosa, Assistant, Seattle, Washington.

Charles H. Hunt, Pullman, Washington.

Prof. R. P. Cope, Pullman, Washington.

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Bacteriologists.

Mrs. Marjory Higgins, Seattle, Washington.

Dr. C. A. Magoon, Pullman, Washington.

Prof. T. J. Murray, Pullman, Washington.

Seed Analyst.

Katherine G. Stone, until April 30, 1918, Olympia, Washington.

Alex Galbraith, from and after May 7, 1918, Olympia, Washington.

Veterinary Inspectors.

Dr. J. H. Martin, Spokane, Washington.

Dr. L. C. Pelton, Seattle, Washington.

Dairy Inspectors.

G. G. Carman, Chehalis, Washington.
A. D. Fish, Seattle, Washington.
O. C. Van Houten, Seattle, Washington.
L. C. Renard, Olympia, Washington.

District Horticultural Inspectors.

P. S. Darlington, Wenatchee, Washington.
J. C. Eakle, Seattle, Washington.
I. R. Fletcher, Camas, Washington.
Henry Huff, Sumner, Washington.
E. B. Kelley, Spokane, Washington.
Harry L. Miller, Walla Walla, Washington.
E. F. Perry, Chehalis, Washington.
Luke Powell, Prosser, Washington.
F. N. Rhodes, Seattle, Washington.
C. B. Wood, Yakima, Washington.

Inspectors of Fourth Division.

Edward L. Jones, Drug Inspector, Spokane, Washington.
Geo. S. Henderson, Food Inspector, Seattle, Washington.
Harry H. Collier, Feed Inspector, South Tacoma, Washington.
Mrs. W. H. Coffin, Bakery Inspector, Tacoma, Washington.
S. P. Wilson, Chief Oil Inspector, Seattle, Washington.
I. W. Groves, Oil Inspector, Seattle, Washington.
B. M. Fowler, Oil Inspector, Spokane, Washington.
B. H. Goldstein, Oil Inspector, Portland, Oregon.

Office Force.

F. H. Gloyd, Secretary to Commissioner and Auditor of Department, Olympia, Washington.
F. Dora Criddle, Stenographer, Olympia, Washington.
Marjorie Holcomb, Stenographer, Olympia, Washington.
Muriel Newcomb, Stenographer, Olympia, Washington.

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THE THIRD BIENNIAL REPORT OF THE DEPARTMENT OF AGRICULTURE OF THE STATE OF WASHINGTON.

On April 2, 1917, the undersigned was appointed to the position of Commissioner of Agriculture, succeeding Dr. H. T. Graves, former chief of the dairy and livestock division and acting commissioner of the Department. On April 3rd the following proclamation was issued by Governor Lister:

STATE OF WASHINGTON, EXECUTIVE DEPARTMENT.

A Proclamation by the Governor:

"A national crisis places upon every citizen the patriotic duty of immediately helping to sustain the United States in the action resulting from interference with our established rights and liberties.

"Equally important with the need for arms and equipment is an adequate supply of food for our nation and the countries whose people and institutions have been attacked by an autocratic government ignoring the rights of humanity.

"Proper preparedness means that energetic attention must at once be given to producing as much as possible from the land, in both the country and the city. The people of this prosperous state have the opportunity today of making a great contribution to the resources that will strengthen the nation—by each man, woman and child undertaking in an intelligent way to increase the yield of food products.

"The man on the farm can be a leader in this patriotic service, but there is hardly a person in any community without the chance to grow something for family use or the market. With the certain knowledge that all citizens will be quick to act for the good of the country, and because organized effort is essential for full service to the nation,

"Now, therefore, I, Ernest Lister, Governor of Washington, by virtue of the authority vested in me by law, do hereby call on the people of the state to co-operate in a great, agricultural preparedness campaign, and direct immediate action to be taken as follows:

"That the county auditor in each county in the state forthwith call to a meeting the county treasurer, county clerk, county agriculturist, county superintendent of schools, the chairman or a representative of the board of county commissioners, an officer from each bank at the county seat, and such other citizens as he may deem advisable, to organize by the election of a chairman and secretary, and the appointment of proper committees, for the purpose of bringing about the fullest possible food production in every part of that county.

"That the local committee in each school district of the state make arrangements for a patriotic rally to be held on Saturday, April 14th, for the purpose of planning action that will be of the most benefit to the nation from encouraging agricultural preparedness.

"That the state granges, farmers' unions, commercial clubs and all other organizations qualified to act and inspired with a patriotic purpose, be invited to join in this service.

"That the State Department of Agriculture, the state educational institutions and schools, and especially those that are serving the agricultural needs of the state, actively support this movement.

"That steps be taken by the active committees throughout the state to devise ways and means for helping anyone willing to cultivate land if assisted in securing seed, a plan suggested being for the person assisted in this way to pay at harvest time the cost of the seed or to return from the crop at least twice the amount of the seed. Or, any other plan which may seem to better suit local conditions may be adopted.

"The State of Washington is rich in resources and I appeal to all citizens of this commonwealth to take an active part in this patriotic movement that will prepare us to meet any demands that may come."

(Signed) ERNEST LISTER,
Governor of Washington.

On April 19th a mass meeting was held at Seattle, at which meeting representatives of nineteen counties of this state were present, and resolutions were adopted investing the Commissioner of Agriculture with the duty and responsibility of taking charge of the campaign of food production and conservation in this state. President E. O. Holland of the State College assigned Mr. R. B. Coglon, the county agent leader, to assist in this work.

The season for planting many crops, especially wheat, was far advanced; it was generally conceded that the best possible service to be rendered in the direction of food production and conservation was through the public press. Many newspaper interviews and public addresses were given; seventeen specially prepared articles containing between five and six hundred words each were mailed to every newspaper publication in the state during this publicity campaign. A most generous co-operation of the press and of the commercial clubs, the members of the agricultural advisory committee, state, county, and school officials and public-spirited citizens generally, resulted in prompt and active efforts of the people of this state in speeding up the food production to an extent that was hardly anticipated at the beginning of the campaign. During the season of 1917 this was the predominant work of this Department.

The effect of this campaign and the willingness of the general public to act was strikingly noticeable in the thousands of kitchen gardens on town lots, vacant and hitherto unused. The Federal Crop Estimates Bureau calculated that more than 4,000 acres of such gardens were grown. The effect was very noticeable on the fall market of an unusually large potato crop in the year 1917.

Some of these war gardens will cease at the end of the war, but very many will continue. The thrift habit once formed is likely to last. The pleasure of the outdoor occupation and the education of the young people in agriculture, dignify the town lot garden and make it a fixture that will stay.

The National Council of Defense, the State Council of Defense, the Federal Food Administration and federal food administrators in the various states were organized during the summer of 1917. Congress appropriated large sums of money to be spent by the Federal Department of Agriculture directly and in co-operation with the state colleges to increase the agricultural productive-

ness of the country and to aid in food and feed conservation. This particular war work during the season of 1918 was therefore carried on by these other agencies, and this Department was able to devote its entire efforts to its regular work except that it has at all times endeavored to assist in the stimulation of agricultural activities.

APPROPRIATIONS.

Following are the appropriations for the Department made by the last legislature, and which became available April 1, 1917, the beginning of the fiscal biennium:

Department of Agriculture.

Salaries and wages:

Commissioner	\$ 8,000 00
Chief, livestock division.....	4,800 00
Chief, horticultural division.....	3,600 00
Chief, foods, feeds, fertilizers, drugs and oils division.....	3,600 00
Clerks and stenographers.....	9,300 00

Supplies, material and service..... 15,200 00

Capitol outlays:

Office furniture and equipment.....	800 00
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Dairy and Livestock Division.

Salary five dairy inspectors.....\$15,000 00

Salaries, material and service of dairy inspectors..... 10,500 00

Salary three veterinary inspectors..... 9,000 00

Wages, supplies, material and service per diem inspectors..... 3,000 00

Supplies, material and service of veterinary inspectors..... 8,000 00

For the destruction of predatory animals to be expended by the agricultural department in conjunction with the U. S. department of agriculture..... 15,000 00

Compensation for slaughter of inspected bovine animals..... 50,000 00

Horticultural Division.

Salary ten inspectors.....\$30,000 00

Supplies, material and service..... 15,000 00

Foods, Feeds, Fertilizers, Drugs and Oils Division.

Salaries and wages.....\$22,200 00

Supplies, material and service..... 11,800 00

\$234,800 00

Washington State Fair.

Salaries and wages.....\$ 9,120 00

Operation and maintenance..... 28,880 00

Capitol outlays:

Construction of new grandstand.....	20,000 00
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58,000 00

State College of Washington.

For the extermination of coulee crickets, to be spent under the direction of the department of agriculture..... 2,000 00

\$294,800 00

It was not foreseen that this country would almost immediately be plunged into war and that the operating costs of the Department would be greatly increased. It has therefore been necessary to make many adjustments and retrenchments that were not contemplated at the time the legislature was in session. The salaries being paid to many employees of this Department

are much below the present rates of compensation which those same employees might readily secure by accepting employment from private firms or corporations. Some of the most valuable experts in this Department have been taken by the federal government at greatly increased compensation. We feel that the continued service for the state by employees who could secure much better salaries elsewhere entitles them to commendation, and it is to be hoped that their services will be appreciated by the legislature to the extent that such reasonable increase may be granted them as to retain their services for the state and thus enable this Department to maintain the high record of efficiency which we believe is accorded to it by the general public and by all with whom we have had business relations.

Statement of fees collected during the biennium, July 1, 1916, to June 30, 1918.

Dairy and livestock division:

Milkmen's licenses.....	\$ 4,206 15
Butter brands	16 50
Stallions and Jacks licenses.....	1,446 40
Registration of marks on dairy cans and tubs.....	100 00
*Predatory animal skins.....	4,443 27
Railroad fare refunded.....	16 33

\$10,228 65

Horticultural division:

Nursery licenses.....	1,675 00
Agents' licenses.....	\$ 242 10
Inspection and disinfection.....	385 49
Inspectors' expense refunded.....	6 60

2,303 19

Foods, feeds, fertilizers, drugs, oils and bakery inspection division:

Oil inspection.....	\$54,827 67
Fees or labels for compound feeds.....	1,494 00
Fines	175 00

56,496 67

Seed division:

Seed inspection.....	39 75
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Total\$69,074 26

***Total amount received from:**

Sales of skins.....	\$5,465 59
Received prior to June 30, 1918.....	4,443 27
Received subsequent to June 30, 1918.....	1,022 32

DAIRY AND LIVESTOCK.

Attention is called to the progress made in reducing disease conditions of the dairy herds through the enforcement of the tuberculin test, so far as it has been allowed by the laws of the state and so far as means have been provided to put these laws into effect. Fifty thousand dollars was appropriated for indemnity to owners of slaughtered animals. More than half of this amount will be turned back to the state treasury unused, the reason being that not enough help was provided to cover the field. The increased expenses of the agents in the field—especially the traveling expenses, living expenses, automobile upkeep, etc.—have made it necessary to reduce the force from three veterinarians to two after October 1, 1918. The purchase of tuberculin and ear tags alone amounted to about \$1,500, which was taken from the expense fund. If that money could have been taken from the \$50,000 fund, it would have left sufficient money in the expense fund to have carried these three men

through to April 1, 1919, but as the appropriation was made specifically to pay for slaughtered animals, it could not be used for this purpose.

It is urgently recommended that provision be made for six veterinarians on this force instead of three, as heretofore. Our recommendation would be to divide the state into five veterinary districts; these doctors working from a home base would be less expensive to the state than heretofore, because they would have no expense account when in their home towns. The idea of having the sixth man is to use him where most needed and in special emergencies.

The advantage of having men assigned to definite districts is, that they will be in closer touch with livestock sanitary conditions, and better able to prevent the introduction and spread of such diseases as sheep scab, hog cholera, glanders, and any other contagious or infectious animal disease that might be introduced in any portion of the state. They could also assist in the enforcement of stallion registration and licenses.

Federal Co-operation in Tuberculosis Eradication.

Under co-operative agreement with the United States Bureau of Animal Industry, several of the pure-bred herd owners of this state have taken advantage of the government offer to inspect their cattle, and when they are found worthy to place them on the accredited herd list of the United States department. This is especially advantageous to herd owners whose stock is likely to be shipped interstate. Recent federal legislation provides for a greater degree of co-operation than has heretofore been possible, whereby the government will co-operate with all states whose laws and appropriations will permit. Under this law the federal funds will be available to pay for one-third of the difference between the appraised value of animals destroyed as reactors and the salvage realized from the sale of the carcass, the sum not to exceed \$25 for grades and \$50 for purebreds. This is providing, however, that the federal government will pay no more than the state in any case. Resolutions from state granges and other agricultural institutions in this state have urged that a higher rate for compensation be fixed. If it is public policy and good business to pay any part of the losses for destroyed animals, it would seem to be only fair that a larger price should be set than \$35, the maximum price heretofore allowed under our law for either grades or purebreds.

It is vitally necessary in the interest of eliminating the livestock disease of tuberculosis among cattle and in the interest of producing a healthful and cleanly milk supply especially for the babies of this state that this Department should have authority to make tuberculin tests of livestock whether the owners desire such tests to be made or not. It is necessary that the sale of tuberculin should be so regulated as to give this Department the absolute control of its use within the state. This can only be done by making it a criminal offense for any person to sell or use tuberculin in this state except upon license or authority of this Department. Abundant evidence in justification of such a law is contained in the records of the Department.

Tuberculosis eradication work could be more systematically carried on and a closer co-operation maintained with county agents in the various counties if five inspection districts shall be established instead of the roving commission of three men as heretofore practiced.

Predatory Animals.

Of the \$15,000 appropriated for co-operation with the United States Bureau of Biological Survey in the campaign against predatory animals in the State of Washington, \$8,173.95 was expended between the time the appropriation became available, April 1, 1917, and July 1, 1918. This appropriation was made with the understanding that the federal government would spend an equal sum of money in this state and would also provide supervising officers and take care of all the office and other overhead expense. As a matter of fact, federal funds to the amount of \$15,249.18 were used to pay the salaries of trappers employed in this state during this period, and 2,151 predatory animals were killed by them.

Of the state funds expended, all except \$6.15 was in payment of trapper salaries, the \$6.15 being used to pay for the burlap used in shipping the furs of the animals killed.

A total of 915 animals were destroyed by trappers paid from state funds. Of this number, 770 were coyotes, 9 were bob-cats, 3 were Canadian lynxes, 1 a cross-fox, 1 an otter, 22 skunks, and 109 badgers.

The furs of these animals became the property of the state and were sold for \$5,426.26. This sum of money, which is 67 per cent of the total amount of state funds expended, has been turned back into the state treasury, leaving a net cost to the state of Washington of \$2,746.69.

The value of this work to the livestock interests of the state is many times greater than the cost. The United States Forest Service estimates that each coyote will in the course of a year destroy livestock to the value of \$50. Many letters from stockmen in various sections of the state all testify in the highest terms to the good accomplished by the men employed in the campaign. One sheep man in the Yakima valley says that one state trapper who worked on his range during lambing season saved him \$3,000, which is more than the total net cost to the state of the entire 15 months' work. He arrived at this estimate by comparing the losses sustained in 1917 with those of 1918.

Obviously, this kind of co-operation, showing such unusually favorable results to the state, would justify an increased appropriation. A \$20,000 appropriation for the next biennium would not only permit of some expansion of this profitable work, providing the government saw fit to match the amount, but it would be a very positive expression of approval by this state of the very efficient manner in which these federal and state funds have been expended by Mr. E. F. Averill, the Predatory Animal Inspector for the states of Washington and Oregon. It is hoped this cooperative work may be further extended to include rats, rabbits, ground squirrels, gophers, moles, predatory hawks, and other pests.

Rabies.

This dread disease has prevailed in all the counties of eastern Washington during a portion of this biennium and in some of the counties during all the time. Three persons have died of hydrophobia, having been bitten by diseased dogs. Sixty persons have been given the Pasteur treatment by the State Health Commissioner, Dr. T. D. Tuttle, in Seattle, these having been exposed by bites of rabid dogs, cats or coyotes.

The general dog-muzzling quarantine covering all counties east of the Cascade Mountains was raised in August, 1917, because of its non-observance.



FROM NEW ZEALAND TO YAKIMA.
Imported 1918.

Romney sheep on irrigated pasture. September (N. Z. springtime) lambs.

A few months later, owing to outbreaks of rabies, and the agreement of citizens and public officials that some attention in the way of law enforcement would be paid to the order, it was again established in the counties of Kittitas, Yakima, Benton and Franklin, and is now effective in these counties.

The reason why the law is not usually enforced is because the local peace officers dislike to incur the enmity of their neighbors and friends by shooting their dogs. It would seem highly desirable to create a state officer whose duty, among other things, would be to enforce this law whenever the public need makes it desirable so to do. One good effect has resulted from the dog-muzzling quarantine order. It has given people a chance to clean up a lot of worthless curs, with or without owners, and thus has helped in the food and feed conservation as a war measure, and the economic result has been noticeable in many communities.

Sheep or Dogs.

The war needs for wool and the appeals of the Government for greater production have started a campaign for increasing the sheep in every part of this nation.

Between 1910 and 1917 the number of sheep in the United States decreased five million head, while the population of the country increased ten million during that period.

The following quotation is from a statement recently made by Lewis Penwell, Chief of the Wool Division of the War Industries Board:

"All available wool is now taken by the government for the army and navy needs, and none is allowed for use in the manufactures for civilian purposes. Seven hundred million pounds will be required for this year's needs of the military forces, and the production of the United States is only 280 million pounds. All of this in the face of a normal consumption here of 650 million pounds yearly. Limited shipping facilities and priorities of other materials essential to winning the war make other importations of wool difficult.

"Decreased production of wool, particularly in the western part of the United States, is distinctly noticeable, but the output can be greatly increased if every farmer were to raise sheep just as he keeps poultry and hogs. Every encouragement should be put forth to induce the production of wool."

This statement was made while we were at war.

The one greatest menace to the success of the industry, especially on the small farms, is the sheep killing dog. Farmer's bulletin 935 on this subject is good. It summarizes as follows: "The dog not only kills sheep but keeps out of the sheep business men who are otherwise inclined to go into it."

"The most effective method of dealing with the sheep killing dog is through efficient legislation."

"Notable progress has been made by several states in enacting good dog laws, and others are expected to take similar action."

"Uniform state dog laws are desirable."

No livestock can be used as profitably and successfully in the burned and seeded logged-off lands of Western Washington as sheep. If the question is between the controlling of dogs and the existence of sheep, the answer should not be difficult.

Bulletins and various publications regarding sheep and other livestock have been freely distributed by this department, and inquiry of stock growers, especially beginners, is always welcome.

HORTICULTURE.

The Division of Horticulture, with the state divided into ten districts and with the counties co-operating by employing county horticultural inspectors in proportion to the horticultural resources of each county, is believed to be generally satisfactory and efficient. Certain portions of the year the work of our ten district inspectors is almost entirely regulatory or police work in maintaining the fruit standards and in protecting the market against misbranding, and against the packing of fruit below standard, and in preventing the introduction of pests. During other portions of the year these inspectors necessarily are called upon to do educational work in their respective fields in order to show the growers the methods by which clean and high grade merchantable fruit can be produced.

POTATOES.

The action of our inspectors in reference to the shipment of potatoes from California containing the tuber moth has unquestionably prevented the introduction of that dreaded potato pest up to date, in this state. We have found it necessary to enforce most rigidly the quarantine regulations vested in this department by our horticultural law, and have been obliged to return to California several carload shipments of potatoes thus infested.

IRRIGATION EXPERIMENT STATION.

It is not our function to engage in research work, but it has been necessary in the Yakima Valley because of the critical condition of the fruit industry and the lack of funds of the State College to carry on some necessary investigation. This work has been done at the request of fruit growers, farmers and county commissioners, and the expense has been borne almost entirely by Yakima County. The last legislature provided for the selection and acquiring by the State College of a site for an irrigation experiment station. Although no funds were appropriated to make the purchase, a site has been secured at no cost to the state which is easily worth, according to values of similar lands in the vicinity, not less than \$10,000. If this donation is taken advantage of by the state, and an experiment station established, there will be no further need for such research work as that heretofore practiced by this department in Yakima County. Unquestionably the institution to render this public service, is the experiment station under the direction of the State College. Irrigated agriculture in the State of Washington at this time represents practically all the wealth of the counties of Yakima, Kittitas, Benton, Chelan, much of Okanogan, and large interests in many other portions of the state. Great as the irrigated wealth of the state now is, the prospects are that in the near future its importance will be enormously increased. The present and future problems incident to this feature of our state's agriculture, make this line of research and investigation one of the most attractive lines of work that can be undertaken. It includes not only the horticultural and agricultural crops grown in the irrigated sections, but also every branch of livestock production.

Coulees Crickets.

The cricket devastation in a small section of Grant County has for several years past been a very serious problem. The earliest cricket infestation of



CHARACTERISTIC YOUNG APPLE ORCHARD IN WASHINGTON.

In 1917 this state produced 4,176,000 barrels of commercial apples, being 300,000 barrels more than the combined production of the two next highest states that year (New York and Virginia). At an estimated average valuation of \$3.75 a barrel (or \$1.25 per box) the crop meant \$15,660,000. It was 19% of the total commercial crop of the United States and 64% of the boxed apple crop. (See official report of the U. S. Bureau of Markets; Division of Crop Estimates.)

which any evidence is available is an outbreak which occurred in the late seventies in the Columbla River Canyon on the west side near Lake Chelan. Indians and white men vouch for this report.

In 1873 an outbreak of crickets, supposed to be the same species as the coulee cricket, occurred near Dayton, Wn. Other outbreaks in Moses Coulee and Grand Coulee occurred from 1892 to 1902. At Ephrata in Grant County a serious epidemic of crickets happened in 1900. They had been increasing in numbers during the two or three years previous, starting from the coulee a few miles north of Moses Lake. In 1903 the most disastrous cricket devastation the state has ever known began when the cricket armies swept up from Moses Coulee and devastated many sections of wheat on the south side of Badger Mountain. The following year—1904—the armies had increased to such an extent that they overran many hundred square miles of that part of Douglas County. This was the first year that any organized resistance was made. Approximately fifty miles of cricket fence was built with ditches and board fences, in a desperate effort to prevent the plague from sweeping the entire country. Fortunately for the country, an unseasonable freeze in the spring of 1905 following an early spring, apparently cleaned up the last vestige of this particular outbreak.

For six or eight years prior to 1916 these crickets were multiplying in the Cold Spring Canyon and Dry Coulee, both lying north of the Great Northern Railway at Stratford and Adrian. In 1916 the development was so great as to become a menace to the entire district and possibly to all of Eastern Washington. During this year the people of Grant County, under the leadership of County Agent H. W. Reaugh, adopted vigorous measures in attempting to hold or exterminate the pest. During 1916 the area covered by crickets amounted to 102 square miles lying between Hartline and Adrian. The principal method of combat pursued during both 1916 and 1917 was the construction of ditches by plowing and shoveling and digging post holes in the ditches a rod apart as traps, and the construction of many miles of board fence eight or ten inches high with a metal strip on top, this method having been borrowed from the Badger Mountain fight of 1904.

Various devices were resorted to in this conflict. Four hundred hogs were brought into the district and herded on these crickets, destroying thousands of them, but incidentally making the hogs sick. Turkeys and chickens were also experimented with, but the construction of the cricket is such that neither hogs, chickens, nor turkeys can feed on them to advantage until after the crickets have been burned or singed. In that condition they make very desirable stock feed for poultry and probably for hogs. During 1917, with all the work that could be done by Grant County, and even with the aid of a large portion of the \$2,000 appropriated by the previous legislature for the purpose, the infested area was increased from 102 to 110 square miles. During the year 1917 among other devices for combating this pest probably none was more efficient than the liquid fire or gasoline torch that was used in destroying them along the fence lines and in the post holes or wherever else they were congregated in thick masses. Large amounts of poison were used. During the first two weeks of the cricket's life this was found to be very effective, but owing to the great area infested, was impracticable to apply.

The Federal Food Production Act of August 10, 1917, provided for the loaning by the federal government of trained entomologists to the various agricultural extension divisions for the purpose of assisting in the extermination of all insect pests detrimental to food production. Mr. Alfred C. Burrill was loaned to this state by the United States Bureau of Entomology, arriving in Grant County early in April. The crickets had already hatched, and it was too late to use poison effectively. Under Mr. Burrill's direction, all available help in the community was employed chiefly in building cricket fences and using torches. During the two months of April and May a hundred people were used, averaging a force of sixteen persons continuously for sixty days. During this time six distinct armies of crickets were encountered, moving as persistently in their different directions as an army of soldiers. These were all successfully conquered. It is reported that one army made six successive charges against different portions of a four-mile defense line. The devastation this year was confined to an area not exceeding ten square miles of pasture land and only one square rod of wheat was destroyed. A ninety-acre field of barley was partially damaged. In previous years several thousand acres of wheat had been destroyed in this cricket infested area, besides orchards, gardens, and pasture lands. This year twenty-four potato sacks were filled with the burned or singed bodies of crickets and taken home by different workers and fed to their poultry. These sacks were estimated to contain over one million crickets, and they did not represent half the number that were believed to have been killed.

While this pest has been visited upon Grant County, every district in Eastern Washington is jeopardized until the pest is exterminated. It is estimated that \$1,000 will be sufficient to care for this work another year, providing the federal government will furnish the assistant as in the past season and stand his expenses, which would make the Government's contribution amount to from five to seven hundred dollars. Unless some general insect pest control measure is adopted it is recommended that an appropriation of \$2,000 be made for this purpose because this menace affects all the farming districts of Eastern Washington, and it is not fair to throw the burden of exterminating this pest upon Grant County, which has heretofore expended in labor and cash not less than \$30,000.

Alfalfa Weevil.

There are approximately 150,000 acres of alfalfa in the State of Washington, more than 100,000 acres being in the Yakima Valley. Allowing an average of five tons per acre, this crop would be 750,000 tons. It is the most valuable forage plant grown in the state. One important authority says: "The cultivation and feeding of alfalfa marks the highest development of modern agriculture. It is the preserver and the conservator of the homestead; it is one of the choicest gifts to man." It would be impossible to estimate the value of the present and prospective alfalfa crop of this 150,000 acres to the agriculture of the State of Washington, and within the next few years we may expect to see the area more than doubled in this state.

In recent years the price has ranged from \$8 to \$15 a ton in the stack. This year it has been \$20 a ton. At that rate this year's crop is worth \$15,000,000. To eliminate this wonderful crop or a large portion of it from the farms of Washington would surely be a catastrophe. This crop is now

jeopardized by the possible introduction of the alfalfa weevil from the infested sections of Utah, Southern Idaho, and parts of Wyoming.

The weevil destroys the first annual cutting and greatly reduces the tonnage of the second cutting. Its first appearance in America was near Salt Lake City, Utah, in 1904. It has gradually enlarged its sphere of devastation until in 1917 it included fifteen counties in Utah, six counties in Idaho, and two counties in Wyoming.

There are portions of our state which lie in the direct avenue of commercial relations with these infested sections. Potatoes from Southern Idaho are being brought into our state every year. There are recent reports of the weevil being found in potato shipments destined for California. Six years ago they were found in carloads of Utah potatoes in the city of Butte, Mont., which fact prompted that state to issue a drastic quarantine, regulating the shipments of all Utah products into that state. California has done likewise. We are now shipping thousands of tons of alfalfa hay into this state from Idaho, and if we escape the introduction of the weevil this year, it will be little short of a miracle; yet there is no law that authorizes this department to restrict, regulate, or quarantine against such a possible calamity.

OTHER INSECT PESTS.

Losses to farm crops in the State of Washington from other insect pests amount to many millions of dollars each year. Much of this could be prevented with comparatively little expense if the control measures which have proved to be reasonably efficient and satisfactory could be applied. The barley loss from aphids during the past season is estimated at over two million bushels—approximately three million dollars. In some districts the first crop of alfalfa was a total loss as a result of aphids, and in many districts the crop was greatly reduced.

Grasshoppers.

The grasshopper devastation in the Okanogan Valley for the past three years has gone practically unchecked, and the menace is on the increase. The Government entomologist in the field, after surveying the district where the eggs had been deposited this year, estimated that seven billion eggs had been deposited, which will make the pest next year vastly worse than it was during the past season. It has been increasing since the pest struck the Okanogan Valley three or four years ago. A few hundred dollars properly expended would have destroyed this particular pest. This year the wheat losses between the towns of Molson and Chesaw amounted to twenty-five thousand bushels. This, with garden and pasture losses, amounted to over eighty thousand dollars.

Entomologists have calculated that twenty-seven grasshoppers per square yard will eat any grain or grass crop faster than it will grow; that sixteen to the square yard will eat a ton of alfalfa a day on forty acres. If the eggs now deposited in the Molson-Chesaw district all hatch, they will be able to eat 2,300 tons of wheat, alfalfa, and grass per day during from sixty to one hundred and twenty days next year.

One farmer in this district the past season spread a pound of paris green in a bait mixture which cost \$1.76 total, and killed within one day six hundred thousand grasshoppers, which would have consumed within the next

month at least four tons of his wheat and laid from five to twenty million more eggs for next year. It will probably cost \$2,000 to fight the grasshopper pest next year in this one district. Grasshoppers in epidemic quantities have been reported from other districts in this state, but no definite information regarding them was secured.

Aphis.

The California Horticultural Commissioner collected in one year eleven tons of ladybugs, using sixteen men for about six months in the work. These were distributed throughout the state to growers of melons, beans, and other crops subject to aphis loss. They are found at certain seasons in the mountains of the Pacific Coast states in large quantities, and if properly cared for and distributed where needed, at the proper time, they constitute a great protection against the aphis pest at a very small cost. It takes twenty-two thousand ladybugs to make a pound. When some of their mountain congregating places are discovered, hundreds of pounds can be secured in a few hours.

Authority Needed.

The last legislature appropriated two thousand dollars to be paid out by this department for coulee cricket control, but unfortunately the act did not provide the necessary police power to make the expenditure efficient. If the Commissioner of Agriculture and his deputies can be clothed with authority to quarantine the infested areas and deputize and employ local citizens and equipment when such action becomes necessary to avert serious disaster, the legislative appropriation would be of vastly more value.

The alfalfa weevil heretofore mentioned is one of the scourges that may cost this state millions of dollars. We know its constant progress in the past fourteen years in Utah and other neighboring states. We know it is liable to be brought into this state even with our best preventive efforts, and more likely while we are now doing little or nothing to prevent its introduction. Our recommendation is that an appropriation be made of fifteen thousand dollars, or so much thereof as may be needed to combat insect pests on cereals, forage, fruit, and other crops, all expenditures to be made under the direction of the United States Bureau of Entomology, or other federal bureaus, working in this state in co-operation with the State College extension division.

Report Strange Bugs.

It is important that any new or unusual bugs or insect pests should be immediately reported either to the State College at Pullman or to the State Department of Agriculture at Olympia. Such a report might save great loss to the state.

SEED SECTION.

Attention is especially called to the report of the seed analyst. The war campaign during the past two years against waste and in favor of increased production of food crops has emphasized the importance of securing better seed and eliminating the waste incident to scattering noxious weeds in commercial seeds. Since the organization of this department, there has been one person employed as seed analyst who, in addition to the duties of making seed tests for purity and germination, has also examined the seed stocks in

the principal business centers of the state not less than twice a year—sometimes oftener, and when violations of the law have been discovered, prosecutions have been made. Necessarily, one person traveling by train could not possibly cover the entire state with any degree of satisfaction, and more especially if that person was also required to do the laboratory work of testing and examining seed samples. The very great importance of this work requires one expert seedsman equipped with an automobile to travel through the state during all the periods of the year, when roads and weather conditions permit, visiting the small towns as well as the larger cities, for it is here that poor grades of seed are more likely to be offered for sale, and also examining fields where seed is being produced for commercial purposes. This expert can co-operate with horticultural inspectors and the county agents and the State Bureau of Farm Markets, and would be of great service to all. In addition, a seed analyst should be employed in the office to test such samples as may be sent in by farmers and seed dealers.

If it is not deemed advisable to appropriate sufficient funds to make the seed section of the State Department of Agriculture reasonably efficient and worth while, then our recommendation would be to cut out entirely that portion of our appropriation and turn over the work of analyzing and testing seeds to the State College and the State University the same as we now use the chemists of those institutions for our work.

THE FOURTH DIVISION.

Foods, Feeds, Fertilizers, Drugs, Oils and Bakery Inspection.

Examination of the report by the chief of this division will clearly indicate the value of these activities to the public health and welfare. No more important or responsible duty rests with any group of state employees than this. The public seldom realizes what protection it is getting from their services. A perusal of this report should be of general interest.

The legislation now deemed most important for this division is a law to provide a better method for enforcing the standards of stock feeds. It is not in accordance with present day practices to allow any person to grind up a combination of comparatively worthless ingredients and sell the same under a trade name without any labeling to indicate its food value. The poultry, dairy, and hog-raising industries of the state are largely dependent upon these feed manufacturers. It is only fair to say that many of the leading firms are as anxious as we are to have a definite law on this subject, because it will give them protection against the unscrupulous dealer and will enable them to buy and sell on market values, and conduct a legitimate business, alike to themselves and to the consumers.

THE STATE FAIR.

The object of all fairs is to educate and enthuse the public along agricultural lines.

"The fair stands as a unique educational force in agriculture, teaching by object lessons, and as a whole, it makes people think. A community in which a good fair is located will produce more at less expense; the same is true of the State Fair." (Report of the Kansas State Board of Agriculture.)

The Washington State Fair was organized by the legislature in 1893. In reaching its quarter of a century mark, it can claim under all the rules by which state fairs are judged that the 1917 and 1918 fairs were, each in turn, the most successful in its history. The development of the state agriculturally, the improvement of the roads by which Yakima is readily accessible during the month of September to every part of the state by automobile, the prosperity of farmers and livestock growers, the interest taken in the fair by the State College through its extension service whereby ninety-five students representing twenty-six counties of the state participated in the last fair—these things, together with the improved equipment, have contributed largely to the present success of the State Fair. The success attained is only the beginning of a much greater value, that hereafter may be expected. More counties represented, better premiums and larger exhibits of livestock and a larger representation of industries and manufactures, especially of farm tools and machinery, may be confidently looked for. The Washington State Fair sheep sale, by public auction conducted at the last two fairs, was the means of distributing \$30,000 worth of high grade and pure bred sheep among the flocks of this state each year. A sale of dairy cattle might be staged on similar lines and would be of much benefit to the dairy interests as well as to the producers of good dairy stock.

The State Fair plant—the grounds and the buildings—is being constantly improved with the earnings and legislative appropriations for this institution. With the present rate of progress and with the construction of necessary buildings, the State Fair in a few years should be a self-supporting institution with a constantly increasing value to the agricultural development of the entire state. Attention is directed to the full report of the Secretary published herewith.

EMERGENCY APPROPRIATION.

If some fund could be available whereby the State Board of Finance (or some other authority) could, upon a proper showing being made, come to the relief of an unforeseen situation, the business of the state could be conducted with greatly reduced appropriations for contingencies. Unless this plan is adopted, the estimated budget for the Department of Agriculture should be increased \$38,000 above the sum specified as being necessary to run the department for two years. The Agricultural Advisory Board deems it unwise to ask for certain fixed sums, because it is impossible to determine in advance the amount to be needed.

In 1914 an outbreak of foot and mouth disease in this state was fortunately averted. It easily might get started and require thousands of dollars to stamp it out. In the summer of 1918, sheep scab was discovered in the summer range in Okanogan County. Over 60,000 head were quarantined and dipped. The sheep industry is too important to the state's welfare to allow such a disease to exist. It must be eradicated, and quickly. It may require several thousand dollars to inspect, quarantine, and supervise the dipping of possibly every sheep in the state before the disease is controlled. This is not likely. We hope it has been stamped out already. But there is a menace and a real danger to the general welfare.

We have had several outbreaks of glanders among horses—a disease also communicable to man. We can never be sure that a most serious outbreak may not occur at any time.

An infestation of alfalfa weevil might be checked if handled immediately, providing funds were available and quarantine laws were adequate; but if no such funds were to be had, the resulting damage to this state would amount to millions of dollars and become a scourge to the alfalfa industry that could not be overcome.

Many other serious things may happen. It is certainly more business-like to have a discretionary power resting with a board consisting of the Governor, the Auditor, and the Treasurer than to make numerous appropriations for specific contingencies, none of which may arise to require any funds during the biennium.

The second year of the State Fair in the biennium is always a gamble on the weather. Fortunately, the weather at that season is usually good, but it is not fair to expect any official to assume the responsibility of insuring good weather for the state by being individually liable for any deficiency that may result from bad weather, besides being criminally liable and subject to a fine of \$1,000. (See Rem., sec. 5026.)

The only alternative is to keep an idle guaranty fund of approximately \$15,000, that may not be used once in ten years, to protect the Commissioner of Agriculture against the contingency of a few days of bad weather during one State Fair week in two years.

LAND SETTLEMENT.

On June 20, 1918, there was held in Seattle under the auspices of the Seattle Chamber of Commerce, and at the special instigation of the Washington Irrigation Institute, a meeting for the purpose of organizing a State Land Settlement Association to consider such activities by other states and by foreign countries, and to draft such legislation for submission to our state legislature as seemed to fit our condition. The chief object of the convention was to help in the making of successful farm homes, and in the reclamation of waste and unused land, primarily in the interest of returned soldiers and sailors who may desire such opportunities, but also for industrial war workers and other worthy persons.

The notable letter of Secretary of the Interior Franklin K. Lane to President Wilson dated May 31 had just been issued, and was accepted as the basis for the efforts of the Washington association. Your Commissioner of Agriculture was elected president of the organization, and in view of the very great agricultural importance of any such movement and with the approval of the Agricultural Advisory Board, has deemed it of sufficient importance to the state to have given considerable time to this work. The executive committee of this association consists of very representative citizens of the state, and it is hoped that such legislation may be enacted by this state as will enable us to participate on a co-operative basis with the federal government in the reclamation, improvement and settlement of the unused lands of this state, whether arid, overflowed and swamp lands, or logged-off lands.

Respectfully submitted,

E. F. BENSON,
Commissioner of Agriculture.

DAIRY AND LIVESTOCK DIVISION.

Hon. E. F. Benson,
Commissioner of Agriculture,
Olympia, Wn.

Sir: For your consideration there is submitted herewith a report of the activities of the Division of Dairy and Livestock for the biennial period ending July 1, 1918. In some cases additional data is appended, bringing the report to November 1, 1918.

The Division of Dairy and Livestock makes investigations as to the existence of infectious and contagious animal diseases, supervising the methods of eradicating the same; makes investigations as to the origin, nature and prevention of such diseases; co-operates with the United States Bureau of Animal Industry, State Board of Health, State College, Experiment Stations, Bureau of Markets and County Agents; investigates the condition and methods of improving the animal industry of the state. It has charge of the inspection of interstate shipments of livestock, the establishment of quarantines for the safeguarding of the livestock industry against disease, and through the power conferred on the Commissioner of Agriculture may slaughter diseased animals whenever the same may be necessary.

This division obtains and disseminates information relative to livestock and dairy production, collects licenses from retail milk venders and stores which retail milk.

The division maintains a corps of dairy and creamery inspectors whose duty is to inspect dairies, creameries, cheese factories, condenseries, milk plants and all places where dairy products are produced, manufactured and sold; to instruct in better methods of production and manufacture, and to recommend improvements when found necessary. Milk and cream testing is done. Milk cans are inspected and condemned when found unfit, or ordered returned to owner when being used unlawfully. Samples of milk, for chemical analysis, are taken from wagons delivering to consumers in towns and cities.

DAIRYING.

The dairy cow stands above all other farm animals in the agricultural development of this state. It is true that other farm animals have played an important part, but the cow has continued to feed the settler, and through the always ready marketable butter, milk, cream or cheese has been a source of revenue to the homemaker. No other animal produces human food so economically from the forage of the field as she. No other farm animal brings as prompt returns on the money invested as she. In the wheat belt of the state she has been the savior of many families when crops failed, and in the alfalfa-growing sections she has offered the best source of market for that wonderful forage, but in Western Washington she has reigned supreme. In this great grass country she has been the means of clearing the forest land, often providing the sustenance for the family while the land was undergoing clearing.

This has been accomplished most often with cows of mediocre ability, but, due to the better breeding of the dairy animals, the education, organiza-

tion and co-operation of the men engaged in the industry, the standard of the dairy cow in this state is reaching a higher plane, until today we can truthfully boast that many of the record cows of the world are now located in this state. The mild, equable climate, the abundance of water, shade and grass are destined to make this one of the great dairy states of the nation.

The evaporated or condensed milk of the state has now a world-wide market. The quality of Washington butter and cheese is being maintained at a high standard, but much low grade butter is still being produced. It is felt, however, that changes in our present dairy laws will have a tendency to improve the quality of butter and cheese manufactured. Recognizing the need of regulatory measures and the benefits that would accrue from standardization, the following recommendations to meet the requirements are suggested:

All glassware used in connection with the Babcock Test should be standardized. Every person, before being allowed to use the Babcock Test for commercial purposes, should be licensed. Examination should be given by the Commissioner of Agriculture or his assistants.

All milk or cream not used in the manufacture of butter should be considered unwholesome when it contains more than .2 of 1 per cent of acidity and has a temperature above 60 degrees Fahr. when it leaves the farm.

All cream used in the manufacture of butter should be considered unwholesome when it contains more than .5 of 1 per cent of acidity and has bad flavors.

A law compelling the pasteurization of all cream used in the manufacture of butter.

A state laboratory equipped for chemical and bacterial work.

While there is much talk of the dairy cow going to the butcher's block, there is reason to believe that there is no need to view the matter through the eyes of an alarmist. Good dairy cows are not plentiful—never were plentiful—and there are always too many of the other kind. It is a matter of congratulation that they are now in the struggle of "the survival of the fittest" being eliminated.

Dairying is fast becoming a specialized industry and through the recent discoveries of agricultural chemists in which it has been found that milk contains growth-promoting substances which are found in nothing else it is only natural that dairy products will receive the recognition they so richly deserve.

The following dairy inspection report by G. G. Carman is herewith submitted:

Dairy Inspection Report.

"In reviewing the work of dairy inspection in Western Washington during the past two years, it is encouraging to note the marked improvement in the tendency to create better dairy products, both from commercial and sanitary standpoints.

The primary object of this work is the protection of the public health, and the time is spent mainly with the producers of dairy products in an effort to educate and instruct. Experience in the past has shown that greater results may be obtained in this manner than by the use of police power.

Owing to the present abnormal prices of labor, building material and other equipment and supplies, it has been the policy of this department to enforce more and better sanitary methods on the farms with the least possible expense for new equipment. Marked improvement has resulted in the handling of milk and milk products in the sections and dairies visited.

During the years of 1915 and 1916 the work was conducted by inspecting each dairy farm of a county before taking up the work in another county. Each dairy was located and numbered on a county map. It has been found, however, that while this method of inspection was fairly successful, it was impossible to get over each district as often as desired, and during the past two years some change has been made in this program. Owing to the vast amount of territory covered in our work and the small number of inspectors employed, a change was advisable. In the two years just passed, we have especially endeavored to take care of the complaints made and calls for assistance. We have also taken up the work from a different basis by inspecting the products offered at the various manufacturing plants, at railroad stations, and from the retail delivery wagons. In this manner the poor product was detected, and when necessary, condemned and returned to the producer. In every case where the product was found to be of poor quality, the farm producing it has been visited and instruction given as to the better care of milk and cream. This method of working has given good results with a minimum of expense.

The milk supply of the smaller cities has also received considerable attention by this department during the past two years. The larger cities, having their own local inspectors, have been able to take care of their own supply, but in numerous instances have been given help from this department, especially in the work of milk and cream scoring contests.

In the smaller cities and towns the work of inspection has devolved entirely on our inspectors. In these towns practically all milk is consumed in the raw state, and it is extremely important that such milk be as pure as possible.

As the health of the milch cow is a very important factor in the production of pure milk, some time has been spent by the inspectors in assisting veterinarians in the tuberculin testing of cows and in holding demonstrations of the lesions found in condemned animals. In this latter work a demand has been created among consumers for safer milk, and we have been able to have ordinances regulating the production and sale of milk passed in several cities.

The sterilization of milk bottles has been demanded in all places where milk is bottled. This is of prime importance because the milk bottles, being exchanged daily from one house to another, might be exposed to many disease germs and can readily become a great factor in the carrying of disease. In places where a steam boiler is not available, and where only a small number of bottles are used, the following device has been recommended: A galvanized iron tank containing a wire rack about four inches from the bottom, and equipped with a tight cover. The tank is made large enough to hold all bottles used, and may be heated from a brick arch, an oil stove or any other contrivance for heating. In using it a small amount of water is used, and a consequently small amount of fuel is necessary. The water is boiled for twenty minutes or longer. A number of these tanks are in use at the present

time and are giving first-class results. As the cheapness of this sterilizer brings it within reach of all bottlers of milk, there is no excuse for the use of unsterilized bottles.

The bacterial count of milk is a great factor in determining its purity. The larger cities, with their own laboratories, have been able to secure a reduction of the bacterial count, and where these counts have been made regularly, a great improvement in the quality of the milk supply has been noted. At Camp Lewis the milk supply for the soldiers has received careful inspection. The bacterial count has here been made daily at the camp laboratory, and by this means the milk supply has been kept up to a high standard. What is being done for the health of the public in the larger cities, where a large percentage of the milk is pasteurized, and in the federal laboratories for the protection of the soldiers, where all milk is pasteurized, should be much more necessary in the smaller towns where all milk is consumed raw. In order to be able to do this, it will be necessary to have a state laboratory, a place available to the inspector at all times, where he may send samples of milk and get the benefit of the analysis.

The predominating complaint of the farmer and dairyman to this department has been in regard to the low reading of the Babcock Test from the various manufacturing plants. These complaints have been investigated by the securing of samples of milk from the complaining parties, testing and checking against the plant, and also by testing at the plant. In nearly all cases no grounds have been found for these complaints, which have undoubtedly emanated in many instances from the improper mixing of the milk or cream on the farm, the lack of taking into consideration the variations in test during the various lactative periods of the individual animals, and other similar causes.

In addition to the work enumerated above, considerable time has been spent in enforcing the provisions of an act passed by the legislature of 1915, relating to the marks and brands on milk cans, tubs and containers used in the manufacture of ice cream and the transportation of all dairy products.

This has been done by taking the cans whenever found, and where they were being used unlawfully and returning them to the rightful owners.

Owing to the necessity of economizing on many food products, together with the high prices prevailing, educational work has been carried on among the consumers of milk in an effort to impress upon them the high food values of milk and dairy products, and to show them the necessity of paying a fair price for this product. This latter phase of the propaganda has been deemed necessary at this time, when the high price of labor, feed, etc., has in many instances so greatly reduced the profit in keeping dairy cows that many farmers and dairymen have felt disposed to sell many of their animals.

G. G. CARMAN,
Dairy Inspector.

MARKET MILK.

The market milk of our cities has been improved from year to year. This has been accomplished by the demands of the people for a better quality of milk. Many of our municipalities now have health officers who are active in the promotion of this work and it has been a pleasure for this division to

co-operate with them and the Dairy Division of the United States Bureau of Animal Industry.

Following is an article by C. F. Hoyt, Market Milk Specialist of the United States Bureau of Animal Industry:

CITY MILK CONTESTS.

A few years ago the public generally came to recognize the fact that the unaided individual purchaser of milk was in no position to distinguish carefully the good from the bad milk offered for sale and to secure for himself a good supply. To so distinguish good pure milk from poor and dangerous milk requires special equipment and time for investigation. Cities and states came to supply this equipment and to employ men for these investigations. Cities and states went further than this and attempted by force to require all milk on the market to meet certain standards as a minimum. By this means the purchaser of milk was afforded some protection from poor or dangerous milk and the producer of good milk was afforded some protection from his unscrupulous competitor. But within wide limits the purchaser could exercise no intelligent choice between good and poor milk and to the same extent the producer of good milk was subject to competition from the producer of poor milk.

Now two objects are sought through milk inspection—the protection of the consumer from poor and unwholesome milk and the protection of the producer from unfair competition. Some five years ago the health authorities of Seattle came to recognize the principle that there exist many grades in the quality of the milk on the market, grades ranging all the way from pure, rich, wholesome milk to that which is a poor or questionable food. With the co-operation of a representative of the Dairy Division, U. S. Department of Agriculture, they proceeded to ascertain these grades. This was done by regularly taking samples from all the various distributors and examining them chemically and bacteriologically and otherwise. At the end of a fixed period of time the values obtained on all the samples of each distributor were averaged. The results were then translated into numerical values by means of the U. S. Department of Agriculture score card.* The final score was then expressed on the basis of 100, and this score on the milk of the various distributors was published in the various newspapers.

By this procedure the consumers generally are enabled themselves to judge the quality of milk supplied by the various milkmen and to choose that which best meets their needs. By this means also justice is done the producer of good milk by having the quality of his product publicly recognized and he is thus relieved from the competition of the dirty or dishonest milkman.

This plan has been consistently followed in Seattle and has resulted in a notable improvement of the milk supply of that city. It has met with general approval and has been adopted in most of the larger Western cities. In the State of Washington the work has been carried on regularly in co-operation between the city health authorities, the State Department of Agriculture and the U. S. Dairy Division in the cities of Seattle, Spokane and Everett, and at irregular intervals in Tacoma. This plan has given excellent

* See U. S. score card, following page.

results by furnishing the consumer a means of judging the quality of the different milks offered, by relieving the producer from the competition of unscrupulous men and by furnishing a means of locating the cause of any fault in quality. It is confidently believed that smaller communities might adopt the plan with profit to themselves.

C. F. HOYT,
Market Milk Specialist.

**UNITED STATES DEPARTMENT OF AGRICULTURE,
Bureau of Animal Industry,
Dairy Division.**

SCORE CARD FOR MILK.

Place
Class..... Exhibit No.....

ITEM	Perfect Score	Score Allowed	Remarks
Bacteria	35	.....	Bacteria found per } cubic centimeter }
Flavor and odor.....	25	.....	Cow, Bitter, Feed, } Flat, Strong, }
Visible dirt.....	10	.....	
Fat	10	.....	Per cent found.....
Solids not fat.....	10	.....	Per cent found.....
Acidity	5	.....	Per cent found.....
Bottle and cap.....	5	.....	{Cap Bottle
Total.....	100	.....	

Exhibitor, ...
Address, ...
(Signed).....
Date, ... 191 Judge.

REPORT OF DAIRY INSPECTORS.

July 1, 1916, to June 30, 1918.

G. G. Carman, July 1, 1916, to July 1, 1918.

A. D. Fish, July 1, 1916, to July 1, 1918.

O. C. Van Houten, May 1, 1917, to July 1, 1918.

C. S. McBride, July 1, 1916, to March 1, 1917.

E. D. Fear, October 1, 1917, to February 1, 1918.

J. C. Kyle, May 1, 1917, to October 1, 1917.

Leslie E. Kelley, January 1, 1918, to April 1, 1918.

	Carman.....	Fish.....	Van Houten.....	Martin.....	McBride.....	Fear.....	Kyle.....	Kelley.....
Dairy inspections.....	1,893	158	905	120	460	586	212	.....
Creamery inspections.....	40	142	11	1	2	8	7	.....
Store and depot inspections.....	254	1,628	834	26	.....	111	16	.....
Cheese factory inspections.....	15	25	1	.....	.....	1	2	.....
Condensed milk factories inspected.....	8	7	4	.....	.....	.....	414	.....
*Samples of milk for butter-fat.....	809	1,181	21	.....	8	41	80	.....
*Samples of cream for butter-fat.....	140	3,187	6	.....	.....	4	11	.....
*Samples of butter.....	81	122	24	.....	.....	.....	.....	.....
*Samples for bacteriological or chemical examination.....	164	90	20	.....	18	.....	.....	.....
Milk cans inspected.....	19,365	10,600	1,240	280	483	822	322	3,425
Milk cans condemned.....	105	152	27	.....	13	84	10	.....
Milk cans returned.....	124	.....	.....	.....	.....	.....	.....	.....
Milk cans found.....	.....	.....	.....	.....	.....	.....	.....	470
Cans milk condemned.....	.....	.....	18	.....	.....	.....	.....	.....
Wagons inspected.....	167	27	89	29	42	34	27	.....
Milk trains inspected.....	14	4	.....	.....	.....	.....	10	.....
Complaints answered.....	86	117	30	3	4	8	4	.....
Orders issued.....	160	150	26	9	23	106	10	.....
Reinspections.....	253	238	155	8	46	63	17	.....
Dairies, creameries, stores, depots and factories closed.....	26	9	8	.....	4	.....	.....	.....
Cows inspected.....	5	1	.....	894	1	89	.....	.....
Arrests.....	3	1	4	.....	.....	.....	.....	.....
Convictions.....	3	1	4	.....	.....	.....	.....	.....
Fines.....	\$20 00	.....	\$55 00	.....	.....	.....	.....	.....

TOTALS

Dairy inspections.....	4,334	Samples milk for butter-fat.....	1,640
Creamery inspections.....	206	Samples cream for butter-fat.....	3,348
Store and depot inspections.....	2,309	Samples of butter.....	177
Cheese factories inspected.....	44	Samples for bacteriological or chemical examination.....	292
Condensed milk factories inspected.....	433	Total samples.....	5,457
Wagons inspected.....	398	Complaints answered.....	252
Milk train inspections.....	28	Orders issued.....	484
Reinspections.....	780		
Total inspections.....	8,592		
Milk cans inspected.....	36,627		
Milk cans condemned.....	391		
Milk cans returned.....	124		
Milk cans found.....	470		
Cans milk condemned.....	13		
Dairies, creameries, stores, depots or factories closed.....	42		
Cows inspected.....	900		
Arrests.....	8		
Convictions.....	8		
Fines.....	\$75 00		

* All samples taken were submitted to Dr. C. W. Johnson and Professor George Olson, Department Chemists, for analysis.

Names, locations and marks of ownership of firms operating under Chapter 101, Laws 1915, being an act relating to the registration of marks upon cans and tubs used in transporting dairy products:

NAME AND LOCATION	BRAND
1. Olympic Ice Cream Company, Tacoma.	Olympic Ice Cream, Tacoma
2. Dungeness Co-operative Creamery Co., Sequim	D. C. C. Co.
3. Bremerton Creamery & Produce Co., Inc., Bremerton.....	Bremerton Creamery, Pasteurized Milk and Cream
4. The Bradner Company, Seattle.....	Brass band marked "Bradner"
5. Glendale Creamery Co., Chimaquam.....	Glendale
6. Purity Milk Products & Refrigerating Co., Centralla.....	Purity
7. Hazelwood Company, Ltd., Spokane....	Hazelwood
8. Swift & Company, Seattle.....	Top red, bottom yellow, handles and top natural color
9. Commercial Creamery Co., Spokane....	Blanchard
10. Turner & Pease Co., Seattle.....	T. & P. Co., Seattle
11. A. Kristoferson, Inc., Seattle.....	Kristoferson
12. Pleasant Hill Dairy, Wenatchee.....	Pleasant Hill Dairy
13. Pine Creek Dairy Co., Spokane.....	P. C. D.
14. The Royal Dairy Company, Bellingham..	R. D. Co.
15. Hollywood Farm, Seattle.....	"H" and "F" interlocked
16. Cowlitz Valley Creamery, Castle Rock..	C. V. C.
17. Montesano Creamery Co., Montesano....	M. C.
18. The Mutual Creamery Co., Seattle.....	Mutual Creamery Company, Jensen Creamery Company, Klock Produce Company
19. Mayflower Dairy, Inc., Seattle.....	M. F. D.
20. Elma Creamery Co., Elma.....	E. C.
21. Cascade Creamery Co., Yakima.....	Cascade Creamery Co., C. C. C.
22. Brooklyn Dairy Products Co., Seattle...	Brooklyn Dairy, a brass leaf representing clover leaf, N. C. D., BR D CO.
23. The Independent Dairy, Inc., Seattle...	Independent Dairy
24. Pure Milk Dairy, Seattle.....	P. M. D.
25. The Independent Dairy, Inc., Seattle....	Redmond Creamery
26. S. Stray, Seattle.....	Seattle D. and M. B. D.; Seattle Dairy
27. Swift & Company, Seattle.....	Swift
28. Miller Bros. Co., Tacoma.....	Miller Bros. Co., Tacoma
29. Wingard Bros. & Co., Tacoma.....	W. B. Co., Tacoma, Wash.
30. Coast Ice & Cold Storage Co., Everett..	C. I. & C. S. Co.
31. Lewis County Co-operative Creamery, Chehalis	L. C. Coop-Cry
32. Broadview Dairy Co., Spokane.....	B. D. Co. and Broadview
33. Royal Ice Cream Co., Tacoma.....	R. I. C. C.
34. Pioneer-Alpine Dairy, Everett.....	P. A. D.

DAIRY STATISTICS.

Securing statistical information from retail milk dealers is an irksome task. The present law relating to this work provides that their reports of business for the fiscal year ending June 30th shall be made to this department not later than November 1st. As many of these firms are delinquent in reporting, and as the biennial report of this department must be issued at this time, it brings added work to the clerical forces to compile these figures.

In the interests of economy it is suggested that these reports be in the department not later than July 1st, and that they cover the calendar year rather than the fiscal year ending June 30th. This procedure would conform

more nearly with the methods of the United States Bureau of Markets, who are charged with gathering statistical information from manufacturers of dairy products. Our reports from cheese factories, condenseries and ice cream plants are, therefore, a duplication of effort.

Following are the statistics of dairy products for the years 1917 and 1918:

**TOTAL PRODUCTION OF MILK AND CREAM BY COUNTIES DURING YEAR
JULY 1, 1916, TO JUNE 30, 1917.**

COUNTIES	Gallons of Milk	Value of Milk	Gallons of Cream	Value of Cream	Total Value of Milk and Cream
Adams.....	17,810	\$5,848	241	\$401	\$6,249
Benton.....	27,545	8,296	695	393	8,689
Chelan.....	71,766	18,111	5,916	8,226	26,337
Challam.....	48,228	17,310	1,700	2,575	19,885
Columbia.....	2,000	600			600
Clarke.....	120,747	37,260	9,398	15,938	53,098
Cowlitz.....	37,627	10,458	502	803	11,261
Douglas.....	12,000	3,360	750	1,200	4,560
Ferry.....	14,756	4,443	680	1,232	5,675
Franklin.....	24,300	7,405	200	440	7,845
Grant.....	11,212	4,495	150	295	4,790
Grays Harbor.....	592,391	171,784	24,299	36,653	208,437
Jefferson.....	63,125	18,576	904	2,025	20,601
King.....	4,716,867	1,586,013	323,828	438,527	2,024,540
Kitsap.....	199,141	48,090	4,777	5,942	54,032
Kittitas.....	53,367	17,503	2,652	3,327	20,830
Klickitat.....	14,400	4,608	299	538	5,146
Lewis.....	144,503	41,789	4,000	6,077	47,866
Lincoln.....	32,680	11,029	1,325	975	12,004
Mason.....	8,000	2,240	210	330	2,570
Okanogan.....	27,400	6,898	1,551	2,094	8,992
Pacific.....	82,012	25,007	986	1,604	26,611
Pend Oreille.....	9,125	3,650	240	490	4,130
Pierce.....	987,798	329,267	65,353	84,927	414,194
Skagit.....	156,845	45,133	5,588	9,482	54,615
Snohomish.....	428,210	113,380	18,498	21,084	134,464
Spokane.....	1,629,209	626,093	163,151	275,893	901,986
Stevens.....	32,140	11,857	910	1,668	13,525
Thurston.....	150,292	45,332	11,072	12,331	57,663
Walla Walla.....	253,916	27,201	22,931	19,526	46,727
Whatecom.....	353,142	98,227	46,487	39,167	137,394
Whitman.....	73,251	22,706	3,154	5,366	28,072
Yakima.....	256,132	83,381	28,156	36,548	119,929
Totals.....	10,651,935	\$3,457,350	750,603	\$1,035,967	\$4,493,317

**TOTAL PRODUCTION OF MILK AND CREAM BY COUNTIES DURING YEAR
JULY 1, 1917, TO JUNE 30, 1918.**

COUNTIES	Gallons of Milk	Value of Milk	Gallons of Cream	Value of Cream	Total Value of Milk and Cream
Adams.....	11,078	\$3,316	281	\$398	\$3,709
Benton.....	87,954	12,417	634	1,248	13,665
Chelan.....	87,836	29,120	7,248	9,061	38,181
Clarke.....	78,929	28,403	1,267	1,952	30,355
Columbia.....	12,625	5,640	260	723	6,368
Cowlitz.....	29,756	10,264	817	522	10,786
Douglas.....	6,750	2,025	200	320	2,345
Ferry.....	81,580	12,464	860	1,340	13,804
Franklin.....	17,911	7,074	985	1,530	8,604
Garfield.....	8,500	1,400	10	26	1,426
Grant.....	17,155	7,091	90	292	7,383
Grays Harbor.....	520,246	116,705	30,072	46,626	163,331
Jefferson.....	118,284	34,095	1,298	2,649	36,734
King.....	4,423,928	1,588,417	253,090	416,684	2,005,101
Kittap.....	828,085	98,965	9,267	11,478	110,463
Kittitas.....	85,436	13,181	1,567	2,671	15,852
Klickitat.....	15,000	5,250	320	590	5,840
Lewis.....	128,871	49,661	3,558	6,682	56,343
Lincoln.....	21,808	8,578	295	521	9,099
Mason.....	18,950	6,170	100	240	6,410
Okanogan.....	15,265	5,736	967	1,616	7,352
Pacific.....	89,699	32,062	382	1,103	33,165
Pend Oreille.....	5,000	2,150	135	250	2,400
Pierce.....	1,415,372	519,745	70,945	139,919	659,664
Skagit.....	101,834	25,046	5,270	7,278	32,324
Snohomish.....	850,833	99,092	12,160	14,670	113,692
Spokane.....	1,686,828	751,440	211,655	323,037	1,074,477
Thurston.....	151,050	54,700	10,902	14,892	69,592
Walla Walla.....	116,135	29,766	16,110	19,423	49,194
Whatcom.....	209,982	71,176	62,614	68,500	134,676
Whitman.....	71,590	27,898	4,836	6,888	34,056
Yakima.....	205,099	72,043	17,264	23,998	96,041
Totals.....	10,872,379	\$3,730,500	724,449	\$1,121,982	\$4,852,482

**BUTTER PRODUCTION IN STATE BY COUNTIES DURING YEAR JULY 1, 1916,
TO JUNE 30, 1917.**

COUNTIES	Pounds of Butterfat Used	Pounds of Butter Made	Value of Butter	Pounds of Butter Exported
Adams.....	6,918	8,291	\$3,316	.....
Benton.....	233,304	347,220	125,243	.....
Chelan.....	30,000	33,000	13,200	.....
Challam.....	725,390	903,661	330,033	.....
Clarke.....	342,731	420,107	157,816	18,862
Columbia.....	2,348	2,786	1,114	.....
Cowlitz.....	73,000	87,069	34,176	.....
Ferry.....	102,087	127,022	50,808	60,000
Grant.....	74,040	88,963	30,716	.....
Grays Harbor.....	273,510	337,595	118,303	.....
Island.....	177,500	224,906	80,850	.....
Jefferson.....	227,737	281,101	106,097	.....
King.....	3,012,364	3,709,159	1,349,095	1,070,140
Kitsap.....	149,447	186,234	62,581	.....
Kittitas.....	453,973	550,320	192,684	7,280
Klickitat.....	103,646	126,554	38,426	88,002
Lewis.....	521,435	649,314	225,083	.....
Lincoln.....	38,906	51,279	18,500	27,900
Mason.....	54,799	67,154	24,811	.....
Okanogan.....	235,523	471,008	162,015	12,430
Pend Oreille.....	56,860	71,075	24,853	.....
Pierce.....	1,044,709	1,224,289	408,177	100,000
San Juan.....	88,932	105,481	50,418	.....
Skagit.....	165,366	201,344	74,977	.....
Snohomish.....	1,164,337	1,428,706	521,179	2,675
Spokane.....	1,455,270	1,824,696	629,576	223,720
Stevens.....	87,234	105,549	43,175	2,318
Thurston.....	371,857	470,977	171,396	15,000
Wahkiakum.....	317,742	381,782	130,764	359,983
Walla Walla.....	567,337	675,943	234,500	160,000
Whatcom.....	1,261,171	1,526,204	564,077	133,200
Whitman.....	83,760	103,248	31,032	.....
Yakima.....	1,094,983	1,359,570	524,151	10,746
Totals.....	14,689,341	18,151,605	\$6,583,477	2,292,761

**BUTTER PRODUCTION IN STATE BY COUNTIES DURING YEAR JULY 1, 1917,
TO JUNE 30, 1918.**

COUNTIES	Pounds of Butterfat Used	Pounds of Butter Made	Value of Butter	Pounds of Butter Exported	Pounds of Butter Imported
Adams.....	12,100	14,987	\$5,995		
Benton.....	179,003	223,368	701,759		
Chelan.....	34,710	42,000	19,420		
Clallam.....	672,935	841,726	383,414		
Clarke.....	372,624	455,238	196,343	30,535	
Columbia.....	14,592	18,174	8,086		
Cowlitz.....	185,047	225,619	144,224	64,971	
Ferry.....	115,059	137,135	62,763	3,200	
Grant.....	29,980	34,779	17,863		
Grays Harbor.....	283,463	351,041	133,238		
Island.....	238,795	288,153	126,103		
Jefferson.....	150,666	186,240	88,834		
Kitsap.....	129,835	176,003	69,849		
King.....	3,133,639	3,903,491	1,754,377	1,319,616	1,896,235
Kittitas.....	425,063	518,164	236,082	49,300	
Lewis.....	408,718	500,110	228,720		1,873
Lincoln.....	27,690	35,065	17,000	12,920	
Mason.....	40,826	49,760	18,961		
Okanogan.....	397,243	490,459	201,438		
Pend Oreille.....	47,134	58,910	27,009		
Pierce.....	729,570	897,255	399,430	10,000	262,800
San Juan.....	125,692	157,032	69,973		
Skagit.....	1,109,702	1,339,728	658,127		
Snohomish.....	618,194	771,078	350,656		
Spokane.....	1,368,605	1,717,812	663,204	245,000	110,000
Stevens.....	98,200	122,499	55,125		
Thurston.....	334,741	407,226	183,942		
Wahkiakum.....	333,114	420,906	193,555	309,538	
Walla Walla.....	616,000	757,600	303,000	200,000	
Whatcom.....	701,507	908,046	410,461		
Whitman.....	73,215	88,617	38,633		4,629
Yakima.....	798,157	975,031	463,424		
Totals.....	18,800,819	17,118,252	\$7,629,628	2,245,140	2,275,037

**CHEESE MADE IN STATE BY COUNTIES DURING YEAR JULY 1, 1916, TO
JUNE 30, 1917.**

COUNTIES	Pounds	Value
Clarke.....	243,660	\$50,859
Grays Harbor.....	303,277	53,323
Jefferson.....	229,516	44,299
King.....	74,021	15,963
Pacific.....	284,978	39,917
Skagit.....	211,183	48,308
Spokane.....	2,005	401
Snohomish.....	508,893	104,433
Whatcom.....	45,094	8,603
Whitman.....	273	68
Yakima.....	101,463	24,351
Totals.....	2,004,363	\$390,525

CHEESE MADE IN STATE BY COUNTIES DURING YEAR JULY 1, 1917, TO JUNE 30, 1918.

COUNTIES	Pounds	Value
Clarke.....	319,115	\$73,958
Cowlitz.....	3,719	893
Grays Harbor.....	437,317	100,497
Jefferson.....	175,776	37,401
Kitsap.....	48,592	12,148
Lewis.....	1,881	414
Okanogan.....	13,500	2,850
Pacific.....	127,750	31,938
Skagit.....	52,257	12,630
Snohomish.....	83,217	17,940
Spokane.....	57,860	13,018
Whatcom.....	8,349	1,837
Yakima.....	97,332	22,435
Totals.....	1,426,665	\$327,959

CONDENSED MILK PRODUCED IN STATE DURING YEAR ENDING JUNE 30, 1917.

Pounds of Whole Milk Used	Cases Produced	Value	Cases Exported
205,657,654	1,844,097	\$8,870,825 00	1,427,949

CONDENSED MILK PRODUCED IN STATE DURING YEAR ENDING JUNE 30, 1918.

Pounds of Whole Milk Used	Cases Produced	Value	Cases Exported
295,645,163	2,964,847	\$14,632,146 00	2,210,610

TOTAL VALUE OF DAIRY PRODUCTS IN STATE, PERIOD JULY 1, 1916, TO JUNE 30, 1918.

Milk and cream.....	\$9,345,749 00
Condensed milk.....	23,502,971 00
Butter.....	4,567,798 00
Cheese.....	718,484 00
By-products.....	322,673 00
Total.....	\$38,457,675 00

CREAMERIES IN THE STATE OF WASHINGTON.**Adams County.**

F. Frick.....Othello
Ritzville Ice & Creamery Co.....Ritzville

Benton County.

Kennewick Co-operative Creamery.....Kennewick
Prosser Co-operative Creamery.....Prosser

Chelan County.

Leavenworth Co-operative Creamery, Inc.....Leavenworth
Pleasant Hill Dairy.....Wenatchee

Clallam County.

Angeles Co-operative Creamery Co.....Port Angeles
Dungeness Co-operative Creamery Co.....Sequim
Glendale Creamery Co.....Dungeness
Glendale Creamery Co.....Forks
Washington Harbor Creamery Co.....Route 2, Sequim

Clarke County.

Brush Prairie Creamery Co.....Brush Prairie
Farmers Co-operative Creamery Co.....Camas
Jersey Creamery Co.....Vancouver
Vancouver Creamery Co.....Vancouver

Columbia County.

Dayton Creamery & Ice Works.....Dayton

Cowlitz County.

Cowlitz Valley Creamery Co.....Castle Rock
Kelso Creamery Co.....Kelso

Ferry County.

Curlew Creamery Co.....Curlew
Eureka Farms, Inc.....Republic

Grant County.

Coulee City Co-operative Creamery.....Coulee City

Grays Harbor County.

Elma Creamery.....Elma
Montesano Creamery Co.....Montesano

Island County.

Island Produce Co.....Langley
Oak Harbor Co-operative Creamery Co.....Oak Harbor

Jefferson County.

Bishop Creamery Co.....Chimacum
Glendale Creamery Co.....Chimacum

King County.

Anderson Creamery Co.....Seattle
The Bradner Co.....Seattle
Dairy Products Co.....Seattle
Ellensburg Produce Co.....Seattle
Enumclaw Co-operative Creamery Co.....Enumclaw
J. L. Evans Creamery.....Seattle
Hollywood Farm.....Seattle
Mutual Creamery Co.....Seattle
Red Shield Creamery Co.....Seattle
Swift & Co.....Seattle
Turner & Pease.....Seattle

Kitsap County.

Bremerton Creamery & Produce Co.....Bremerton
Port Orchard Produce Co.....Port Orchard
Poulsbo Creamery.....Poulsbo

Kittitas County.

Consolidated Creamery Co.....Ellensburg
Ellensburg Produce Co.....Ellensburg
Kittitas Valley Creamery.....Ellensburg

Klickitat County.

Trout Lake Co-operative Dairy Assn.....Trout Lake

Lewis County.

Farmers Co-operative Creamery Co.....Centralia
Lewis County Co-operative Creamery Co.....Chehalis
Pleasant Valley Creamery.....Chehalis
Purity Creamery Co.....Centralia
Winlock Co-operative Creamery Co.....Winlock

Lincoln County.

Odessa Creamery Odessa

Mason County.

Mason County Fruit Growers' Assn.....Shelton

Okanogan County.

Coast Ice & Cold Storage Co.....Winthrop
Farmers Mutual Creamery Assn.....Tonasket
Methow Valley Creamery Assn.....Twisp
Oroville Creamery.....Oroville

Pend Oreille County.

Newport Creamery Assn.....Newport

Pierce County.

Lake Park Creamery.....Spanaway
Miller Brothers Tacoma
Puyallup Ice Cream Co.....Puyallup
Tacoma City Creamery.....Tacoma
Olympia Ice Cream Co.....Tacoma
Roy Co-operative Creamery Assn.....Roy

San Juan County.

Richardson Creamery Richardson
San Juan Co-operative Creamery Co.....Friday Harbor

Skagit County.

Anacortes Ice Company.....Anacortes
Skagit Valley Dairy Produce Co.....Mount Vernon
West Coast Dairy Co.....Anacortes
Carnation Milk Products Co.....Mount Vernon
Finstad & Utgaard, Inc.....Conway

Snohomish County.

Arlington Co-operative Assn.....Arlington
Coast Ice & Cold Storage Co.....Everett
Fern Bluff Creamery.....Monroe
Granite Falls Creamery.....Granite Falls
Holcomb Dairy.....Snohomish
Snohomish Creamery.....Snohomish
Sultan Basin Creamery.....Sultan
Snohomish Dairy Products Co.....Snohomish

Spokane County.

Commercial Creamery Co.....	Spokane
Deer Park Creamery.....	Deer Park
Fairfield Co-operative Creamery Co.....	Fairfield
The Fairmont Creamery Co.....	Spokane
Hazelwood Company, Ltd.....	Spokane
Pine Creek Dairy.....	Spokane
Broadview Dairy	Spokane

Stevens County.

Old Dominion Creamery Co.....	Colville
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Thurston County.

A. L. Brown Farm.....	Nisqually
Capital City Creamery.....	Olympia
Olympia Dairy Products Co.....	Olympia
Tenino Creamery.....	Tenino
Yelm Co-operative Creamery.....	Yelm

Wahkiakum County.

Farmers Co-operative Produce & Warehouse Assn.....	Grays River
Ferndale Creamery.....	Grays River
Skamokawa Farmers Creamery Assn.....	Skamokawa

Walla Walla County.

Hazelwood Company, Ltd.....	Walla Walla
The Walla Walla Creamery.....	Walla Walla

Whatcom County.

Blaine Creamery Co.....	Blaine
Ferndale Creamery Co.....	Ferndale
Ford Creamery Co., Inc.....	Bellingham
Laurel Co-operative Creamery Assn.....	Route 2, Bellingham
Lynden Creamery Co.....	Lynden
Royal Dairy Co.....	Bellingham

Whitman County.

Jersey Creamery Co.....	Colfax
Palouse Creamery	Palouse
Tekoa Creamery Co.....	Tekoa
Washington State College Creamery.....	Pullman

Yakima County.

The Bradner Company.....	Sunnyside
Cascade Creamery Co.....	Yakima
Cowiche Creamery Co.....	Cowiche
Yakima City Creamery.....	Yakima

CONDENSERIES IN THE STATE OF WASHINGTON.**Clarke County.**

Henningsen Produce Co.....	Washougal
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Grays Harbor County.

Seattle Ice Cream Co.....	Montesano
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King County.

Borden Condensed Milk Co.....	Auburn
Carnation Milk Products Co.....	Seattle
Carnation Milk Products Co.....	Carnation
Carnation Milk Products Co.....	Kent
Enumclaw Condensed Milk Co.....	Enumclaw
Meadowbrook Condensed Milk Co.....	Issaquah

Lewis County.

Carnation Milk Products Co.....Chehalis

Skagit County.

Carnation Milk Products Co.....Sedro Woolley

Carnation Milk Products Co.....Mount Vernon

Federal Condensed Milk Co.....Mount Vernon

Snohomish County.

Carnation Milk Products Co.....Monroe

Carnation Milk Products Co.....Stanwood

Snohomish Dairy Products Co.....Snohomish

Whatcom County.

Carnation Milk Products Co.....Everson

Mount Vernon Cream Co.....Ferndale

Yakima County.

Cascade Creamery Co.....Yakima

CHEESE FACTORIES IN THE STATE OF WASHINGTON.**Clarke County.**

Battleground Co-operative Dairy Assn.....Battleground

The Lackamas Valley Co-operative Dairy Assn.....Orchards

Cowlitz County.

Portland-Damascus Creamery Co.....Woodland

Woodland Cheese Factory.....Woodland

Grays Harbor County.

Montesano Creamery Co.....Montesano

Oakville Co-operative Cheese Factory.....Oakville

Satsop Co-operative Cheese Factory.....Satsop

Jefferson County.

Bishop Creamery Co.....Chimacum

Glendale Creamery Co.....Chimacum

Glendale Creamery Co.....Center

Kitsap County.

Silverdale Poultry Assn.....Silverdale

Lewis County.

Vonrotz Brothers' Cheese Factory.....Winlock

Pacific County.

Green Meadow Cheese Factory.....South Bend

Skagit County.

Finstad & Utgaard.....Conway

Hamilton Cheese Factory.....Hamilton

Snohomish County.

Arlington Co-operative Assn.....Arlington

Whatcom County.

Royal Dairy Co.....Bellingham

Yakima County.

Cowiche Creamery Cowiche

Mutual Creamery Co.....Toppenish

LIVESTOCK STATISTICS BY COUNTIES.
State Board of Equalization Report.

COUNTIES	STOCK, SHEEP AND GOATS					SHEEP BUCKS FOR BREEDING PURPOSES					HOGS					MULES				
	1915	1916	1917	1918	1919	1915	1916	1917	1918	1919	1915	1916	1917	1918	1919	1915	1916	1917	1918	1919
Adams.....	8,299	16,530	15,551	21,079	6,737	2,284	2,284	304	7,892	6,938	5,181	5,390	5,181	5,390	1,683	1,717	1,683	1,684	1,689	1,689
Asotin.....	16,707	13,075	11,190	12,487	117	59	59	55	4,610	4,349	2,784	2,784	2,784	2,784	217	188	217	217	148	148
Benton.....	69,307	70,970	66,730	79,143	212	226	226	62	1,633	1,644	1,310	1,785	1,310	1,785	262	108	262	181	117	117
Chelan.....	2,166	4,413	744	1,461	.....	.....	.....	404	1,633	1,644	943	1,785	943	1,785	262	209	262	252	250	250
Chelan.....	1,035	961	891	1,089	13	6	6	14	1,633	1,644	943	1,785	943	1,785	42	50	42	31	132	132
Clark.....	1,311	1,672	2,860	3,324	95	105	105	52	3,477	3,388	2,839	2,839	2,839	2,839	104	97	104	119	119	119
Columbia.....	20,887	16,614	15,948	17,191	218	127	127	157	5,554	5,554	3,388	3,388	3,388	3,388	1,374	1,236	1,374	1,384	1,611	1,611
Cowlitz.....	786	796	1,081	918	7	20	20	14	.....	.....	.....	.....	.....	.....	6	6	6	18	12	12
Douglas.....	631	918	573	2,952	4	6	6	75	7,811	6,560	4,869	3,756	4,869	3,756	967	1,109	967	1,203	917	917
Ferry.....	290	245	349	994	7	15	15	12	853	705	909	905	909	905	127	127	127	116	111	111
Franklin.....	31,150	28,949	31,483	45,875	148	81	81	81	9,061	2,173	1,236	1,236	1,236	1,236	533	475	533	849	1,008	1,008
Garfield.....	9,852	11,901	11,695	11,390	108	108	108	95	9,061	7,061	7,061	7,061	7,061	7,061	414	405	414	464	464	464
Grant.....	38,830	51,298	41,298	52,552	157	1,001	1,001	97	5,973	4,898	3,286	3,286	3,286	3,286	581	566	581	563	554	554
Grays Harbor.....	1,095	1,094	1,050	1,250	6	8	8	80	2,183	1,824	1,497	2,303	1,497	2,303	9	23	9	18	12	12
Island.....	1,497	1,417	1,424	1,661	.....	.....	.....	4	635	347	337	495	337	495	11	11	11	12	9	9
Jefferson.....	114	323	233	236	226	118	118	5	208	159	239	659	239	659	2	2	2	13	13	13
King.....	1,676	1,712	1,756	2,473	633	684	684	721	4,248	4,315	4,315	4,315	4,315	4,315	400	400	422	437	440	440
Kitsap.....	279	208	201	244	9	.....	.....	6	848	618	600	856	600	856	1	1	5	7	4	4
Kittitas.....	38,658	35,636	41,831	49,476	194	317	317	270	5,617	9,290	2,744	2,549	2,744	2,549	101	78	78	85	110	110
Klickitat.....	45,068	46,915	45,049	52,067	416	381	381	277	13,762	9,924	6,817	6,176	6,817	6,176	278	295	278	287	247	247
Lewis.....	2,536	2,549	2,139	2,023	9	13	13	4	4,315	3,414	3,665	5,594	3,665	5,594	58	69	58	82	100	100
Lincoln.....	1,632	1,396	1,997	2,197	212	15	15	85	6,633	6,009	5,315	4,797	5,315	4,797	1,945	1,945	2,025	2,068	1,795	1,795
Mason.....	256	302	295	330	21	.....	.....	1	323	223	210	449	210	449	3	3	4	2	2	2
Okanogan.....	6,037	5,846	5,552	13,434	147	106	106	105	6,240	5,225	3,894	6,505	3,894	6,505	442	401	401	386	342	342
Pacific.....	123	113	120	232	.....	.....	.....	.....	361	391	292	520	292	520	4	4	2	15	12	12
Pend Oreille.....	164	190	354	164	51	40	40	1	563	333	288	370	288	370	33	24	33	105	40	40
Pierce.....	1,073	1,376	1,393	1,190	139	151	151	196	3,198	3,150	3,044	4,235	3,044	4,235	74	63	63	105	40	40
San Juan.....	5,666	4,810	5,912	5,963	10	2	2	6	448	1,236	1,236	1,236	1,236	1,236	4	4	4	8	8	8
Skagit.....	947	231	366	963	20	467	467	39	1,277	1,045	562	1,219	562	1,219	16	16	16	13	26	26
Skamania.....	169	66	91	712	.....	.....	.....	.....	229	1,853	1,463	2,223	1,463	2,223	46	31	31	30	30	30
Stonemish.....	367	342	362	362	104	68	68	39	2,194	1,853	1,463	2,223	1,463	2,223	46	31	31	30	30	30
Spokane.....	860	744	1,623	1,560	167	115	115	600	8,259	6,750	6,000	6,749	6,000	6,749	556	466	466	422	424	424
Stevens.....	4,062	6,069	8,995	7,813	610	.....	.....	.....	.....	4,551	3,380	4,869	3,380	4,869	150	163	150	217	213	213
Thurston.....	1,269	1,517	1,862	1,782	118	13	129	129	2,773	2,282	2,843	2,022	2,843	2,022	36	50	36	50	35	35
Wahkiakum.....	31,589	25,882	28,994	31,473	117	127	127	149	478	347	259	390	347	259	390	.....	.....	.....	.....	.....
Walla Walla.....	1,531	1,068	1,053	1,375	.....	.....	.....	.....	7,965	6,668	6,386	7,077	6,386	7,077	3,230	3,450	3,450	3,568	4,016	4,016
Whatcom.....	15,888	14,239	16,414	18,048	.....	.....	.....	.....	2,948	1,619	1,167	1,438	1,619	1,438	39	37	39	43	43	43
Whitman.....	105,927	121,234	114,944	136,608	1,223	1,907	1,907	2,489	22,323	27,614	19,068	18,168	27,614	19,068	2,008	2,131	2,008	2,131	2,243	2,243
Yakima.....	499,823	493,578	489,704	587,408	11,627	8,874	8,874	7,046	187,929	166,838	116,053	140,164	166,838	116,053	16,185	16,682	16,185	16,682	17,516	17,516
Totals.....	499,823	493,578	489,704	587,408	11,627	8,874	8,874	7,046	187,929	166,838	116,053	140,164	166,838	116,053	16,185	16,682	16,185	16,682	17,516	17,495

LIVESTOCK STATISTICS BY COUNTIES.—Continued.

COUNTIES	HORSES																			
	One Year Old				Two Years Old				Three Years Old and Over				Work Horses				Stallions			
	1915	1916	1917	1918	1915	1916	1917	1918	1915	1916	1917	1918	1915	1916	1917	1918	1915	1916	1917	1918
Adams.....	1,453	1,374	1,559	1,523	1,171	1,230	1,361	1,339	1,006	1,033	1,062	1,000	7,981	8,183	9,053	9,502	62	55	56	71
Asotin.....	555	554	523	523	1,171	1,230	1,361	1,339	1,006	1,033	1,062	1,000	7,981	8,183	9,053	9,502	62	55	56	71
Benton.....	587	537	706	645	1,171	1,230	1,361	1,339	1,006	1,033	1,062	1,000	7,981	8,183	9,053	9,502	62	55	56	71
Chelan.....	131	107	137	104	137	104	137	104	137	104	137	104	137	104	137	104	137	104	137	104
Clallam.....	137	122	173	163	105	204	194	140	204	294	284	403	403	614	614	614	614	614	614	614
Clark.....	334	425	173	275	356	257	217	171	298	284	294	294	294	314	314	314	314	314	314	314
Columbia.....	861	789	157	628	782	785	673	654	1,285	1,159	1,122	941	4,554	4,351	4,009	4,194	43	35	33	3
Cowlitz.....	180	176	189	172	170	145	172	143	274	158	1,327	304	856	865	1,303	1,156	1	4	4	6
Douglas.....	2,253	1,967	1,785	1,976	1,677	2,490	2,523	1,685	2,063	1,628	1,922	1,622	9,907	9,338	9,948	10,638	58	44	62	74
Ferry.....	265	267	350	298	248	248	292	278	1,652	1,568	1,014	1,333	247	2,911	2,198	2,449	16	13	13	21
Franklin.....	444	863	595	653	495	298	479	542	923	508	1,074	1,856	3,517	2,473	2,890	46	34	22	25	
Grant.....	842	971	871	701	849	735	855	897	2,468	1,894	1,868	1,899	5,210	5,865	6,366	7,153	21	26	30	64
Grays Harbor.....	1,169	1,174	1,423	1,544	1,519	1,097	1,721	1,472	910	923	849	1,266	1,356	1,684	1,454	1,497	2	1	1	7
Island.....	160	170	169	178	146	166	194	147	668	344	297	102	1,626	1,684	1,576	564	2	1	1	5
Jefferson.....	189	91	85	86	108	88	42	55	15	256	298	298	608	562	576	564	2	1	1	5
King.....	22	14	19	25	20	12	30	18	12	50	61	473	440	461	520	41	8	4	8	4
Kittitas.....	493	453	516	525	497	480	546	560	3,198	3,201	3,431	3,520	8,644	8,645	8,832	63	76	81	86	4
Klickitat.....	48	17	10	27	24	27	37	14	1,071	963	573	522	229	295	297	300	2	2	1	1
Lewis & Clark.....	1,058	1,055	1,131	763	1,060	907	898	898	1,060	967	1,218	1,312	2,008	2,695	2,863	3,7	31	13	23	1
Lincoln.....	854	612	764	619	768	560	909	589	3,216	2,600	2,319	3,068	3,059	2,898	2,894	2,678	46	34	22	25
Mason.....	905	840	537	523	534	576	334	276	399	368	571	798	3,537	3,410	3,380	3,478	12	10	8	8
Moran.....	2,839	2,837	2,923	2,711	2,539	2,203	2,170	2,041	2,402	2,117	1,731	1,946	14,686	14,220	14,738	15,238	82	112	73	89
Mullanbach.....	66	40	60	51	52	50	52	90	279	355	295	312	442	358	335	235	2	3	.....	.....
Okanogan.....	1,530	1,843	1,765	1,783	1,965	1,877	1,846	1,871	3,487	3,673	3,566	3,293	6,773	6,044	7,046	8,308	112	123	153	166
Pacific.....	61	65	46	44	69	65	60	40	170	84	117	107	651	711	589	659	2	3	1	.....
Pend Oreille.....	42	40	113	62	44	50	32	38	123	144	147	105	1,001	1,126	1,149	941	8	15	1	.....
Pierce.....	193	195	177	143	195	201	211	195	3,271	3,345	3,645	2,758	2,527	2,501	2,549	2,627	17	15	14	13
San Juan.....	90	92	52	45	105	82	53	65	134	164	169	351	753	751	437	465	8	11	4	2
Schacabaw.....	297	225	141	142	300	246	232	175	504	341	601	647	2,393	2,640	2,474	2,419	19	11	9	3
Shoshone.....	170	154	7	71	243	191	284	174	284	851	1,089	548	3,213	3,101	2,862	2,709	7	8	11	4
Spokane.....	1,373	1,206	1,074	1,080	1,173	1,282	1,094	908	1,893	1,776	1,251	1,224	14,406	13,895	9,924	9,924	63	52	47	42
Stevens.....	683	706	841	954	850	784	937	1,000	1,500	1,564	1,613	2,013	4,384	4,300	5,955	4,461	31	19	25	29
Thurston.....	306	251	232	178	222	189	142	166	1,507	1,373	413	666	1,914	2,023	1,683	1,687	24	24	10	10
Wahkiakum.....	3	9	21	10	21	8	7	5	4	15	12	1	1	1	238	276	273	.....	.....	.....
Walla Walla.....	1,052	969	844	892	996	926	896	873	1,646	1,601	1,806	1,621	7,821	7,933	7,661	8,066	51	55	62	52
Whitcom.....	280	237	231	238	306	274	258	204	828	967	532	178	3,462	3,009	3,296	3,630	15	16	7	7
Whitman.....	3,623	3,290	2,894	3,016	3,895	3,140	3,017	2,768	1,998	2,049	1,648	1,977	19,844	19,941	20,940	21,660	138	107	156	112
Yakima.....	1,683	1,704	1,737	1,922	1,758	2,021	3,059	2,889	3,377	2,399	3,008	2,988	9,566	8,609	7,840	7,582	61	57	39	39
Totals.....	27,055	26,272	25,416	25,792	26,312	26,554	27,151	24,461	47,606	44,804	44,101	44,851	100,747	150,547	156,998	168,315	143	1,105	1,093	1,108

LIVESTOCK STATISTICS BY COUNTIES.—Concluded.

COUNTIES	STOCK CATTLE					BULLS FOR BREED- ING PURPOSES					MILCH COWS				
	One Year Old					Three Years Old and Over									
	1915	1916	1917	1918		1915	1916	1917	1918		1915	1916	1917	1918	
Adams.....	1,906	2,272	2,432	2,298	1,746	1,654	1,686	1,413	1,580	128	118	122	138	2,228	2,426
Asotin.....	1,743	1,830	2,104	2,425	1,433	1,433	1,563	1,965	3,234	97	120	112	113	2,813	2,952
Benton.....	1,731	1,766	1,961	1,961	1,863	1,863	1,863	1,863	1,863	70	94	69	66	2,405	2,844
Chelan.....	1,713	1,827	1,969	1,961	1,888	1,888	1,888	1,888	1,888	38	70	57	70	1,860	2,355
Clallam.....	1,291	1,366	1,343	1,685	1,052	1,109	902	1,082	403	109	123	125	125	1,804	1,804
Clark.....	3,735	4,081	3,796	3,534	3,087	3,087	3,087	3,087	3,087	385	409	352	317	3,669	3,337
Columbia.....	1,623	1,602	1,891	1,806	1,261	1,307	1,270	1,401	1,846	110	114	110	87	1,513	1,240
Cowlitz.....	1,656	1,886	1,188	1,976	1,113	1,230	1,569	1,415	591	173	180	166	166	1,507	1,444
Douglas.....	1,807	2,160	2,427	2,355	1,199	1,705	1,452	1,421	572	180	173	180	166	3,100	4,049
Ferry.....	1,383	1,769	1,921	2,187	1,231	1,327	1,357	1,351	1,027	92	92	673	96	2,666	2,965
Franklin.....	3,799	4,233	5,339	867	211	253	429	642	1,684	29	89	81	101	877	1,530
Garfield.....	1,490	2,346	2,401	2,177	1,630	1,753	1,924	1,946	1,062	114	120	127	127	2,237	2,674
Grant.....	1,780	2,580	2,955	2,904	1,576	1,954	3,134	5,148	1,335	86	91	125	182	4,327	4,349
Grays Harbor.....	1,965	2,285	1,948	1,649	1,845	1,600	1,467	1,185	764	205	183	179	193	2,647	2,091
Island.....	647	500	616	578	340	312	531	583	20	43	43	55	55	1,657	1,868
Jefferson.....	411	372	517	532	224	177	322	387	130	77	65	77	77	1,657	1,868
King.....	3,280	3,826	3,913	3,930	2,045	2,619	2,662	2,664	2,008	603	690	711	715	21,202	23,075
Klickitat.....	4,270	7,014	5,144	10,458	2,643	2,932	2,928	2,935	1,08	76	72	41	42	2,844	3,184
Klickitat.....	2,781	3,235	3,890	4,025	1,804	2,866	3,512	3,099	2,719	243	330	252	383	3,518	3,710
Lewis.....	6,443	7,313	6,195	6,122	2,530	3,917	2,885	2,412	2,641	151	137	209	183	1,973	2,217
Lincoln.....	4,610	4,404	4,513	4,400	2,281	2,890	3,105	2,965	1,827	331	300	320	373	10,926	11,945
Mason.....	783	806	768	698	558	676	618	698	477	154	154	184	202	4,896	4,068
Okanogan.....	8,101	8,887	9,634	12,914	5,382	6,329	5,408	5,325	6,800	964	640	540	487	1,424	1,908
Pacific.....	1,852	1,688	1,605	1,608	831	915	883	869	827	79	81	61	61	1,884	1,884
Pend Oreille.....	6,631	8,236	8,944	8,905	417	464	533	452	331	44	53	59	219	1,962	1,962
Perce.....	2,634	2,311	2,164	1,854	1,676	1,726	1,663	1,576	823	116	123	130	138	1,892	1,892
San Juan.....	4,737	6,400	6,637	3,069	479	566	440	472	1,32	230	225	257	219	3,158	3,158
Skiat.....	4,881	8,820	9,230	2,804	2,926	2,799	2,761	2,948	2,367	75	81	61	61	1,884	1,884
Skamania.....	5,293	5,277	4,525	4,823	4,469	3,511	3,403	3,127	892	33	24	32	32	13,677	13,677
Snohomish.....	4,700	5,090	4,195	4,594	2,534	3,207	2,833	2,941	1,415	551	551	542	609	9,872	10,619
Spokane.....	3,939	4,062	5,479	6,324	3,864	3,057	3,291	3,822	1,683	372	372	388	218	4,981	5,024
Thurston.....	4,544	4,825	3,078	3,179	1,150	1,669	1,502	1,435	226	181	220	211	189	5,185	5,203
Wahakum.....	557	563	503	403	396	478	446	496	31	74	75	83	83	2,022	1,878
Walla Walla.....	2,363	2,405	2,478	2,458	1,533	1,706	1,646	1,646	1,646	182	182	153	145	3,198	3,198
Whatcom.....	4,652	4,415	4,188	4,305	3,350	3,182	3,273	3,160	2,431	438	485	456	489	11,878	11,878
Whitman.....	5,628	6,182	6,944	5,910	3,241	4,128	4,128	4,128	5,502	233	233	263	333	7,769	7,769
Yakima.....	9,440	12,939	13,305	11,733	6,481	7,800	7,800	7,800	5,199	426	476	391	444	11,976	11,554
Totals.....	106,456	119,654	117,286	122,968	66,378	74,417	79,142	79,579	60,807	7,219	7,917	8,295	7,727	174,985	193,915

TOTAL NUMBER OF LIVESTOCK IN THE STATE OF WASHINGTON.
State Board of Equalization Report.

	1915	1916	1917	1918
Cattle.....	232,400	254,881	264,104	279,159
Milch cows and bulls.....	182,204	199,739	198,656	201,642
Horses.....	261,723	254,282	254,754	259,095
Hogs.....	187,929	156,338	116,053	140,164
Sheep.....	481,450	502,152	489,750	587,408

**NUMBER OF FLEECES, AVERAGE WEIGHT PER FLEECE, NUMBER OF
POUNDS OF WOOL PRODUCED DURING 1916 AND 1917,
AND PRICE PER POUND OF WOOL.**

1917 Year Book, United States Department of Agriculture.

	1916	1917
Fleeces.....	594,000	594,000
Weight per fleece (pounds).....	8.0	8.4
Production (pounds).....	4,750,000	4,988,000
Price per pound April 1.....	\$0.24	\$0.38
Price per pound October 1.....	.27	.56

**ESTIMATED NUMBER OF CATTLE, SHEEP, HORSES, MULES, MILCH COWS,
AND HOGS.**

Taken from the Monthly Crop Reports of the United States Department of
Agriculture.

	1915	1916	1917	1918
WASHINGTON—				
Cattle.....	215,000	255,000	280,000	294,000
Sheep.....	546,000	568,000	585,000	661,000
Horses.....	311,000	308,000	300,000	309,000
Mules.....	15,000	17,000	19,000	19,000
Milch cows.....	253,000	263,000	263,000	266,000
Hogs.....	327,000	314,000	283,000	283,000
UNITED STATES—				
Cattle.....	37,067,000	39,812,000	41,689,000	43,546,000
Sheep.....	49,956,000	48,625,000	47,616,000	48,900,000
Horses.....	21,195,000	21,159,000	21,210,000	21,563,000
Mules.....	4,479,000	4,593,000	4,723,000	4,824,000
Milch cows.....	21,262,000	22,108,000	22,894,000	23,284,000
Hogs.....	64,618,000	67,766,000	67,503,000	71,374,000

ESTIMATED VALUE ON FARMS JANUARY 1, 1915-1918, OF CATTLE, HORSES, MULES, MILCH COWS, HOGS AND SHEEP.
Monthly Crop Report, United States Department of Agriculture.
WASHINGTON

VALUE PER HEAD JANUARY 1										TOTAL VALUE JANUARY 1						
1918					All Ages											
Under 1 Year		2 Years and Over		1918	1917		1916		1915	1918		1917		1916		1915
Lambs	Ewes 1 Yr. and Over	Wethers 1 Yr. and Over	Rams													
\$9 00	\$12 00	\$11 50	\$21 00	11 40	7 10	5 30	4 80									
Total Value (all livestock)																

UNITED STATES

VALUE PER HEAD JANUARY 1										TOTAL VALUE JANUARY 1			
1918				All Ages									
Under 1 Year	1 Year Under 2	2 Years and Over		1918	1917	1916	1915	1918	1917	1916	1915		
Cattle.....	\$23 45	\$46 80	\$55 62	\$40 98	\$35 92	\$33 53	\$33 38	\$1,780,052,000	\$1,497,021,000	\$1,334,928,000	\$1,237,376,000		
Horses.....	45 72	70 25	114 34	104 23	102 89	101 60	103 33	2,248,692,000	2,182,307,000	2,149,786,000	2,190,102,000		
Mules.....	57 61	86 35	135 98	128 74	118 15	113 36	112 36	621,064,000	558,006,000	522,834,000	503,271,000		
Milch cows.....	.....	.....	.....	70 59	59 63	53 92	55 33	1,643,039,000	1,365,251,000	1,191,965,000	1,176,888,000		
Hogs.....	.....	.....	.....	19 51	11 75	8 40	9 87	1,892,276,000	792,898,000	569,573,000	637,479,000		
Sheep.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Lambs 1 Yr. and Over	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Wethers 1 Yr. and Over	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Rams	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Total Value (all livestock).....	\$9 06	\$12 70	\$11 25	\$20 77	7 13	5.17	4 50	\$3,263,524,000	\$6,735,913,000	\$6,020,670,000	\$5,969,253,000		

The following list of active livestock organizations was obtained by the Extension Service of the Washington State College, through the County Agricultural Agents of the state.

NAME OF ORGANIZATION	President	Address	Secretary	Address	No. of Members	When Meetings Occur	Place of Meetings
Pierce County Milk Producers' Association.	O. R. McKinney.	Tacoma.	J. Wilcox.	Roy.	150	First Mon. in June	Tacoma
Snohomish County Dairymen's Association.	John Lee.	Norman.			200	First Sat. in Oct.	
Snohomish County Guernsey Association.	J. E. Wraga.	Arlington.			10	At call.	
Garden Jersey Club.	W. G. Grimm.	Arlington.			15	At call.	
Arlington Bull Club.	Genas Farrington.	Arlington.			10	At call.	
Granite Falls Bull Club.			Floyd Chews.		3	At call.	
Thompson Bull Club.	Hans Thompson.	Arlington.			5	At call.	
Monroe Bull Club.	F. C. Fuchs.	Sultan.			4	At call.	
Sultan Bull Club.	E. F. Glover.	Monroe.			4	At call.	
Stillaguamish Cow Testing Association.	J. E. Wraga.	Arlington.			4	At call.	
Stanwood Cow Testing Association.	J. A. Knutson.	Stanwood.					
Grays Harbor Dairymen's Association.	Ransom Minkler.	Elma.	J. R. Murphy.	Montesano.	150	At call.	
Castle Rock Cow Testing Association.	G. Howard.	Castle Rock.					
Washington Wool Growers' Association.	Huntington.	Walla Walla.	F. A. Roglin.	Castle Rock.	15	Annually	Castle Rock
Lewis County Pure Breeders' Association.	Tom Drumheller.	Ochella.	J. F. Sears.	Prosser.	55	Semi-annually, winter and summer	Yakima
Grant County Cattle Growers' Association.	H. V. Swan.	Low Gap.	C. E. Cline.	Burke.	75	2d Sat. each month	Ochella and vicinity
Whatcom County Jersey Cattle Club.	Cyrus Gates.	S. Bellingham.	E. F. G. Carlson.	Bellingham.	50	Annually	Low Gap
Whatcom County Guernsey Cattle Club.	H. B. Douglas.	Ferdale.	B. C. Vander Grand.	Lynden.	15	Annually	Bellingham
Ferdale Cow Testing Association.	H. B. Douglas.	Ferdale.	T. C. Johnson.	Ferdale.	20	Quarterly	Lynden or Ferndale
Whatcom County Dairymen's Association.	O. F. Brown.	Everson.	A. H. Dahlquist.	Sumas.	250	Monthly	No set place
Whatcom County Poultry Association.	B. S. Hillier.	Bellingham.	G. Van Horn.	Marietta.	130	Monthly	No set place
Stagit County Dairymen's Association.	Wm. Kantgen.	Mt. Vernon.	John B. Hall.	Mt. Vernon.	600	At call of president	No set place
Clinton Bull Club.	F. L. Kingsley.	Clinton.	H. H. Williams.	Clinton.	12	Irregular	
Whidby Cow Testing Association.	J. D. Capaan.	Oak Harbor.	Fred Morgan.	Oak Harbor.	15	Irregular	Oak Harbor
Island County Guernsey Breeders' Association.	John Frostad.	Oak Harbor.	J. M. Pratt.	Oak Harbor.	14	Last Sat. in Aug.	Oak Harbor
Bayview Bull Club.	F. A. Harth.	Langley.			11	Irregular	
Clarke County Cow Testing Association.	Roy Dobbs.	Washougal.	Geo. Anderson.	Battle Ground.	41	Annually	Vancouver
Riverside Bull Club.			H. H. Peter.	Kennewick.			
Richland Bull Club.			J. O. Willis.	Richland.			
Prosser Bull Club.			Lee Ferguson.	Prosser.			
Paterson Bull Club.			Geo. McNealey.	Patterson.			
Dairymen's Union.	Sam Ross.	Richland.	J. O. Willis.	Richland.			
Mt. Adams Cattle Association.			R. R. Kreps.	Laurel.			
Trout Lake Cattle Association.	Ulrich Zuber-buchlar.	Trout Lake.	O. A. Pearson.	Trout Lake.			

LIVESTOCK ORGANIZATIONS.—Concluded.

NAME OF ORGANIZATION	President	Address	Secretary	Address	No. of Mem- bers	When Meetings Occurs	Places of Meetings
South Union Bull Association.....	Fred Helten.....	Tunwater	.....	.....	7	.....	South Union
Thurston County Dairy and Farm Products Association.....	D. Johnson.....	Route Little Rock.....	R. E. Munn.....	Route 1, Tunwater	.....	5th of each month	.....
Walla Walla Milk Producers' Association...	V. E. Brown.....	Route 2, Walla Walla	R. L. Ridley.....	Route 2, Walla Walla	27	On call February and August	Green Valley School
Walla Walla Cow Testing Association.....	W. E. Brown.....	Walla Walla	C. Baker.....	Walla Walla	30	January on call...	County Agent's office
Pend Oreille Livestock Association.....	P. J. Sullivan...	Ousick.....	E. J. Batchelor...	Newport...	26	Irregular.....	Court House, Newport
Wahkiakum County Cow Testing Associat'n Cattle and Horse Raisers' Association.....	H. L. Webster...	Stamokawa...	F. A. Durrah....	Grays River...	50	.....	.....
Ellemham Fercheron Horse Company.....	B. J. Batie.....	Twisp.....	G. W. Sprouse...	Twisp.....	6	First Mon. in April	Twisp
Okanogan County Livestock Association.....	S. A. DeMerchant	812 Exchange	Roy Bury.....	Tonasket.....	.....	April each year...	Okanogan
Wauconda Cattle and Horse Raisers' Association.....	Jas. E. Forde...	Bank Bldg., Spokane	Hugh Miller.....	Riverside....	.....	.....	.....
Conconully Cattle and Horse Raisers' Association.....	O. H. Smith.....	Wauconda....	B. C. Gregory...	Wauconda....	50	June.....	Wauconda Hall
Loop Loop Cattle and Horse Raisers' Association.....	J. M. Meyers...	Conconully...	P. H. Pinkston..	Conconully...	35	Quarterly.....	Conconully
Methow Valley Cattle and Horse Association	John Chalmers..	Okanogan....	C. H. Eller.....	Okanogan....	36	Last Sat. in Jan., April, July, Nov.	Pine Grove School
Brewster Cattle and Horse Association.....	Geo. Isenhart...	Winthrop....	F. F. Ventzke...	Winthrop....	.....	January.....	Winthrop Brewster
Chilliwist Cattle and Horse Association.....	Amos Tupper...	Brewster....	Chester Tupper..	Brewster....	.....	.....	.....
Ellemham Horse and Cattle Association.....	W. E. Freis.....	Brewster....	J. N. Moore.....	Olema.....	35	Last Friday each quarter	Park Grange Hall
Loomis Cattle and Horse Association.....	M. D. Hirsch- berger.....	Oroville.....	Otto Hirsch- berger.....	Oroville.....	.....	December	Loomis
Lower Methow Horse and Cattle Association	S. G. Bernard...	Loomis.....	Will Forde.....	Loomis.....	.....	January	Methow
Pine Creek Cattle and Horse Association.....	Virgil Dunbar..	Pateros.....	Chas. Grant.....	Methow.....	.....	March.....	Pine Creek Grange Hall
Stevens County Livestock Association.....	W. J. Utt.....	Riverside....	Sherman Burden..	Tonasket....	.....	.....	.....
Stevens County Breeders' Club.....	Geo. Turner.....	Myers Falls..	Earl Gates.....	Oolville.....	.....	On call.....	.....
Washington State Dairymen's Association..	H. T. Steels...	Adity.....	Mr. Lewis.....	Arden.....	.....	.....	.....
Northwest Livestock Association.....	Wm. Bishop...	Chimacum....	Ada E. Miller...	Alaska Bldg. Seattle	.....	November	Lewiston, Idaho
	Thos. F. Wren..	Spokane.....	.....	.....	.....	.....	.....

STALLION REGISTRATION.

The law relating to the registration of stallions and jacks was amended at the 1917 session of the legislature and became effective June 8, 1917. Provisions were made in this enactment to limit the fees that should be charged by the examining veterinarian for the inspection of stallions for soundness, and provided that they should have the endorsement of the commissioner of agriculture before undertaking this work. It was also provided that all jacks and stallions used for public service should be licensed. Previous to this law becoming effective, all licenses were issued for a period of two years, dating from the date of issuance. The present law, however, provides that all licenses shall expire on December 31st of the year following the year in which the license was issued. This will be of much assistance in checking the renewals.

The enforcement of this act resting, as it does, on the commissioner of agriculture, has frequently brought about much correspondence on the subject. If district veterinary inspectors of the department were appointed, there is reason to believe that a more careful surveillance over stallions used in public service could be had.

Following will be found a list of registry associations, and it will be found that we have included two jack associations for the reason that the standards of both are about the same. Neither association has been recognized by the National Society of Record Associations for the reason that their standards do not meet the requirements of the national association. Height, color and measurements appear to be the only requirements necessary for registration in the jack associations, whereas breeding is of first importance in the stallion registry associations recognized by this department.

Registry Associations.

Recognized as standard by the Washington Department of Agriculture:

American Trotter.....	American Trotting Register	American Trotting Register Association, 137 South Ashland Boulevard, Chicago, Ill.
Arabian	Stud Book of the Arabian Horse Club of America.....	Arabian Horse Club of America; H. K. Bush-Brown, secretary; Newburgh, N. Y.
Belgian Draft	American Register of Belgian Draft Horses.....	American Association of Importers and Breeders of Belgian Draft Horses; J. D. Conner, Jr., secretary, Wabash, Ind.
Cleveland Bay	American Cleveland Bay Stud Book.....	Cleveland Bay Society of America; R. P. Stericker, secretary, 4035 Sheridan Road, Chicago, Ill.
Clydesdale	American Clydesdale Stud Book.....	American Clydesdale Association; P. E. Fleming, secretary, U. S. Yards, Chicago, Ill.
French Coach	French Coach Stud Book	French Coach Horse Society of America; Duncan E. Willett, secretary, Maple avenue and Harrison street, Oak Park, Ill.

French Draft	National Register of French Draft Horses	National French Draft Horse Association of America; C. E. Stubbs, secretary, Fairfield, Ia.
German Coach, Oldenburg	German, Hanoverian and Oldenburg Coach Horse Stud Book.....	German, Hanoverian and Oldenburg Coach Horse Association of America; J. Crouch, secretary, Lafayette, Ind.
Hackney	American Hackney Stud Book.....	American Hackney Horse Society; Gurney C. Gue, secretary, 460 Fulton avenue, Hempstead, L. I., N. Y.
Jacks and Jennets.....	American Jack Stock Stud Book.....	American Breeders' Association of Jacks and Jennets, J. M. Jones, secretary, Columbia, Tenn.
Jacks and Jennets.....	Standard Jack and Jennet Registry of America	Standard Jack and Jennet Registry Association; Wm. E. Morton, secretary, Kansas City, Mo.
Morgan	American Morgan Register	American Morgan Register Association; T. E. Boyce, secretary, Middlebury, Vt.
Percheron	Percheron Stud Book of America.....	Percheron Society of America; Wayne Dinsmore, secretary, U. S. Yards, Chicago, Ill.
Percheron	The American Breeders' and Importers' Percheron Registry..	The American Breeders' and Importers' Percheron Registry Co.; John A. Forney, secretary, Plainfield, Ohio.
Saddle Horse	American Saddle Horse Register	American Saddle Horse Breeders' Association; R. H. Lillard, secretary, Louisville, Ky.
Shetland Pony	American Shetland Pony Club Stud Book.....	American Shetland Pony Club; Miss Julia M. Wade, secretary, Lafayette, Ind.
Shire	American Shire Horse Stud Book.....	American Shire Horse Association; W. G. Lynch, secretary, Tonica, Ill.
Suffolk	American Suffolk Horse Stud Book.....	American Suffolk Horse Association; R. P. Stericker, secretary, 4035 Sheridan Road, Chicago, Ill.
Thoroughbred	American Stud Book...	The Jockey Club; W. H. Rowe, Register, 18 East 41st street, New York, N. Y.
Welsh Pony and Cob...	Welsh Pony and Cob Stud Book.....	The Welsh Pony and Cob Society of America; Miss Julia M. Wade, secretary, Lafayette, Ind.

Foreign Associations.

Recognized as standard by the Washington Department of Agriculture:

Societe le Cheval de Trait Belge; Chevalier G. H. Hynderick, secretary, Brussels, Belgium. Stud Book des Chevaux de Trait Belges.

Clydesdale Horse Society of the United Kingdom of Great Britain and Ireland; Archibald MacNeillage, secretary, 93 Hope street, Glasgow, Scotland. Clydesdale Stud Book.

Societe des Agri culteurs de France; Henri Johanet, secretary, 8 Rue d'Athens, France. Stud Book des Chevaux de Trait, Français.

Hackney Horse Society; Frank F. Euren, secretary, 12 Hanover Square, London, W., England. Hackney Stud Book.

La Societe Hippique Percheronne de France; E. Lemaire, secretary, Nogent-le-Rotrou, France. Stud Percheron de France.

Shetland Pony Stud Book Society; R. W. Walker, secretary, 3 Golden Square, Aberdeen, Scotland. Shetland Pony Stud Book.

Shire Horse Society; J. Sloughgrove, secretary, 12 Hanover Square, London, W., England. Shire Horse Society Stud Book.

Suffolk Horse Society; Fred Smith, secretary, Rendlesham, Woodbridge, Suffolk, England. Suffolk Stud Book.

Australian Stud Book; W. C. Yuille & Sons, Melbourne, Australia. Australian Thoroughbred Stud Book.

General Stud Book; Weatherby & Sons, 6 Old Burlington street, London, W., England.

The Welsh Pony and Cob Society; John P. Bache, secretary, Knighton, Radnorshire, Wales. Welsh Pony and Cob Stud Book.

Canadian National Records; Secretary, Ottawa, Canada.

Not recognized as standard by the Washington Department of Agriculture:

American Horse Breeders' Trotting Registry Association, 161 High street, Boston, Mass.

American Horse Registry Association; N. J. Harris, secretary, Des Moines, Ia.

American Iceland Pony Club; George H. Simpson, secretary, Wheaton, Ill.

American Percheron Registry Association; S. H. Heberling, secretary, La Grange, Ill.

Belgian-American Draft Horse Registry; A. J. Myers, secretary, Lovington, Ill.

Coach and Draft Horse Association of America; Frederick Wrightman, secretary, La Crosse, Wis.

Hartman Stock Farm Registry Record Company; Adam Kramm, secretary, Columbus, Ohio.

International Consolidated Record Association; H. A. Jones, secretary, Pen Yan, N. Y.

Morrison's International Roadster Register, Des Moines, Iowa.

National Percheron Horse Breeders' Association; W. E. Phillips, secretary. (Address unknown).

National Hackney Stud Book; N. A. Randall, secretary, Crawfordsville, Ind.

The American Jack Register; W. L. DeClow, secretary, Cedar Rapids, Iowa.

The National Standard Pacing and Trotting Horse Breeders' Association; Thos. C. Parsons, registrar, Cleveland, Ohio.

United States Horse Register; J. E. Ragsdale, secretary, Gibson City, Ill.

Wagon Horse Association of America; W. B. Carpenter, president, Kansas City, Mo.

Following is a list of counties showing the number and breed of stallions that are duly licensed to be used in public service.

A directory of stallions showing the data on each individual animal will soon be issued by this department and will be available for free distribution:

COUNTIES	STALLIONS											JACKS		TOTALS		
	Percheron.....	Belgian.....	Shire.....	Clydesdale.....	French Draft.....	French Coach.....	German Coach.....	Arabian.....	Morgan.....	Thoroughbred.....	American Trotting.....	Grade Stallions.....	Pure-bred Jacks.....	Grade Jacks.....	Total Pure-Bred.....	Grand Total.....
Adams.....	18	2	3	1	.....	.....	.....	.....	.....	.....	10	4	3	28	13	41
Asotin.....	5	1	1	1	.....	.....	.....	.....	.....	.....	11	.....	.....	8	11	19
Benton.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	1	2	8	6	14
Chelan.....	2	.....	.....	.....	.....	.....	.....	.....	.....	2	8	2	1	6	9	15
Clallam.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	2	1	3
Clarke.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	.....	1	4	8
Columbia.....	4	4	2	.....	.....	.....	.....	.....	.....	.....	3	1	2	11	5	16
Cowlitz.....	2	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	4	.....	4
Douglas.....	18	4	9	2	3	1	1	.....	.....	.....	33	1	5	39	38	77
Ferry.....	3	1	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	2	4	7	11
Franklin.....	7	.....	3	.....	.....	.....	.....	.....	.....	.....	3	1	3	11	6	17
Garfield.....	6	2	1	2	1	.....	.....	.....	.....	.....	3	1	2	14	1	15
Grant.....	19	3	5	1	1	.....	1	.....	.....	1	22	.....	2	31	24	55
Grays Harbor.....	2	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	4
Island.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
King.....	3	.....	1	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	4	2	6
Kitsap.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Kittitas.....	10	.....	1	2	2	.....	.....	.....	1	.....	1	7	.....	17	7	24
Klickitat.....	4	4	1	2	4	.....	.....	.....	.....	.....	3	.....	.....	18	3	21
Lewis.....	2	3	1	.....	.....	.....	1	.....	.....	.....	4	2	1	9	5	14
Lincoln.....	20	7	4	2	2	.....	.....	.....	.....	.....	19	9	7	44	26	70
Okanogan.....	10	.....	5	2	1	1	1	1	.....	1	38	2	2	24	40	64
Pend Oreille.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	3	.....	3
Pierce.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	1	3	4
Skagit.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	2	.....	.....	1	2	3
Skamania.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	1
Snohomish.....	2	.....	.....	1	.....	.....	.....	.....	.....	.....	2	.....	.....	3	2	5
Spokane.....	13	6	6	.....	2	.....	.....	.....	.....	.....	8	13	1	40	9	49
Stevens.....	5	2	1	.....	.....	.....	.....	.....	.....	.....	16	2	1	10	17	27
Thurston.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	5	.....	.....	2	5	7
Walla Walla.....	12	1	3	.....	1	.....	.....	.....	.....	.....	7	2	.....	19	7	26
Whatcom.....	1	3	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	4	1	5
Whitman.....	41	13	30	22	3	.....	.....	.....	.....	.....	26	13	13	122	39	161
Yakima.....	17	.....	4	4	1	1	.....	.....	1	.....	17	3	1	31	18	49
Out of state.....	3	2	1	.....	.....	.....	.....	.....	1	.....	7	.....	.....	7	7	14
Totals.....	243	61	82	42	24	4	4	1	3	4	2	275	62	47	532	854

NUMBER OF STALLIONS AND JACKS LICENSED IN STATE SINCE ENACTMENT OF STALLION REGISTRATION LAW.

YEAR REPORT PUBLISHED	STALLIONS		JACKS	
	Pure-bred	Not Pure-bred	Pure-bred	Not Pure-bred
1913.....	430	307	7	67
1914.....	584	534	18	83
1916.....	506	423	20	71
1918.....	473	276	56	47

ANIMAL DISEASE CONTROL.

The eradication and control of contagious and infectious animal diseases in this state has taken much of the time and funds of this division. Livestock constitutes an important factor in the agricultural development of the state, and this industry must be safeguarded both from a public health and economic standpoint. As an example we have the suppression of tuberculosis, the eradication of hog cholera, the prevention of the spread of glanders, the treatment and control of sheep scab, and the institution of control measures in districts in which rabies is prevalent. Many of the communicable animal diseases are transmissible to man, and measures taken for their control are really public health measures and deserve the attention of the general public as well as those interested only in livestock.

The conservation of the livestock of the nation in the present crisis is a problem that deserves our close attention, and this division has been especially watchful in the matter of investigating suspected cases of contagious animal diseases. In this manner we have endeavored to do our part in the production of food for our people at home, our allies and our troops abroad.

The need of a state laboratory to be used in diagnosing animal diseases is often felt, as it is often impossible to correctly diagnose many of the diseases of farm animals under field conditions. This laboratory should be equipped for bacteriological, chemical and pathological work and could be used in co-operation with the State Board of Health, Public Service Commission, Industrial Insurance Commission, State College, University, and other state agencies. At the present time we are not equipped to make laboratory examinations of any material submitted to us for that purpose and are not able to make a study of obscure diseases and ascertain the cause. Because of this, unnecessary losses of livestock often occur. The laboratory diagnosis of rabies is now being done for us by the State Commissioner of Health and the veterinary department of Washington State College, but they do not have the apparatus necessary to diagnose certain other pathological conditions. Likewise, the chemists of the State University and the State College cannot handle many of the important chemical analyses so necessary in the performance of our work.

INTERSTATE TRANSPORTATION OF LIVESTOCK.

Our laws and regulations relating to the transportation interstate of cattle, horses, swine and sheep are based upon the necessity of protecting the livestock of this state from extra-state sources of infection. This is a problem requiring our constant attention. The department orders relative to these matters have been transmitted to the Chief of the United States Bureau of Animal Industry, and the veterinarians having charge of the livestock sanitary control work in the several states, and they in turn notify the veterinarians who are authorized by them to examine livestock for interstate shipment. We have found, however, that in some cases our regulations are violated both by shippers and examining veterinary inspectors. The veterinarians comprising the membership of the Northwest Livestock Sanitary Association have taken steps to abate this condition by withdrawing the authorization to inspect livestock destined to other states from veterinarians who have been guilty of wilfully violating the interstate regulations of the state to which the livestock has

been destined. Shippers who have held our state regulations lightly have been watched until we have reason to believe that very few diseased animals are now being shipped to us.

At the present time—November 1, 1918—our regulations provide as follows:

Breeding and dairy cattle brought into this state shall be accompanied by health certificate, including a tuberculin test chart.

Pure-bred swine may be crated and shipped by express upon affidavit of the owner that the animals have not been affected with hog cholera and have not been exposed thereto.

Swine from public stockyards, after entering the state, must be quarantined for three weeks on the premises of the owner. A federal regulation requires the immunization by anti-hog cholera serum of all swine shipped interstate from public stockyards.

Horses must be accompanied by a health certificate.

Sheep shall be accompanied by a health certificate and an affidavit of the owner to the effect that they are not, to the best of his knowledge, affected with scabies, and have not been exposed thereto.

Livestock, intended for immediate slaughter, billed to recognized slaughtering establishments, are exempt from the foregoing regulations.

BOVINE TUBERCULOSIS.

The statistics of the department in connection with tuberculosis would indicate that we are making substantial progress in the control and ultimate eradication of this disease. The intradermal tuberculin test has been used with satisfactory results, as it was clearly demonstrated during the biennium of 1914-16 that this method of testing in the hands of a trained operator will give excellent results in eradicating the disease from the herd. While our investigations show that the disease is widespread throughout the state, there is cause for congratulation to learn that Washington is not so extensively affected as are most other states of the Union. The inspection work that has been done has indicated to us many of the centers of infection, and one of the most serious obstacles to the eradication of the disease in a community has been the absence of a specific law whereby we could apply the tuberculin test to the suspected herd without the permission of the owner. The department inspectors have, however, in many instances, applied the test after it has been conclusively proved that tubercular animals have originated from that herd.

A perusal of the appended table would indicate that the disease appears to be diminishing as rapidly as we had hoped, our results showing 3.88 per cent of diseased cattle. It is to the herds that have been under our care for the past two or more years that we must look to to show favorable results. Improvement in the condition of diseased herds cannot be expected always after the application of one test, although many cases are on record in the department in which the spread of the disease appears to have been arrested after one test and the removal of the reactors.

The prejudice of the public against the use of meats and dairy products of reacting cattle has been a serious handicap to our efforts to make headway in the matter of controlling bovine tuberculosis. This disease may be looked upon from two viewpoints; first as an economic problem affecting the

financial interests of the owner, and second, as a menace to the public health. In the past it has been met by the destruction of the reacting animal, irrespective of whether or not physical symptoms of tuberculosis were exhibited. The fact that pasteurization of the milk of a clinically healthy but reacting cow would safeguard the consumer has not been considered. Tuberculin tests applied annually and the removal of the reactors does not protect the public against infected dairy products. Pasteurization renders the product reasonably safe, but it must be remembered that this method does not reach the source of the contamination. Should we draw a line between the animal which has reacted and appears healthy and the animal which clearly shows evidence of tuberculosis? Should we demand a state-wide pasteurization law, or a state-wide tuberculin test law, or both? Should we allow the use of milk from reactors under restrictions which will safeguard the public? Should we control the sale of tuberculin? These questions are of the utmost importance to the cattle interests of the state and should receive the serious consideration of our legislators. If some plan can be put in operation whereby the owner of tubercular cattle can eradicate the disease from his herd without serious financial loss, the tuberculosis problem will be solved from the economic standpoint. The indemnity feature of our law, together with the indemnity that is promised through the United States Bureau of Animal Industry, will aid materially in handling the slaughtered reactors. The problems then remaining are the disposal of the physically healthy reactor which is held in quarantine, and the handling of the herd of the man who does not allow his herd to be tested by any legal authorities. Such owners often secretly test their own herds which may be diseased and are a menace to their neighbors who are making an honest effort to rid their own cattle of this insidious disease. The holding of the physically healthy reactors by the Bang method and the sale of the pasteurized products under proper district veterinary inspector surveillance will aid in solving the problem. As for the uncontrolled sale and use of tuberculin, there is ample reason to believe that this one factor has been a great hindrance to the successful control of the disease and should be stopped.

The line of work in bovine tuberculosis control has been practically the same as in the previous biennium with the exception that numbered identification tags are now being used on all animals tested. This will assist our inspectors in tracing the origin of cattle which have been previously tested by us. Another innovation is the co-operation of the tuberculosis eradication division of the Bureau of Animal Industry in the establishment of accredited herds and the testing of cattle within circumscribed areas.

The Division of Dairy and Livestock has enjoyed the hearty co-operation of the health officers of the various cities of the state and is particularly indebted to the city of Seattle, which maintains a force of four veterinarians, two of whom are bonded to this department. Because of the tuberculin tests conducted by these men, the department is relieved of the testing of cows which furnish the milk supply to Seattle.

The tuberculin testing of cattle has been continued except when interrupted by calls of a more urgent nature. Early in September of 1918 it was seen that the funds appropriated to meet the expenses of the veterinary inspectors would not admit of the continuance of this work as heretofore. A circular letter was sent to the county agents, applicants, and others interested

in this work, calling their attention to the present status of this phase of our work. It was arranged that bonds be prepared for some of the local veterinarians so that the inspection and testing could be carried on under the provisions of section 3201.

Following is a list of veterinarians who are now (November 1, 1918) under bond to the department:

J. H. Martin.....	Spokane
H. T. Graves.....	Puyallup
L. C. Pelton.....	Seattle
C. H. Schultz.....	Seattle
Jas. P. Johnson.....	Seattle
Robert McBride.....	Everett
Jas. T. Seeley.....	Seattle
F. E. Smith.....	Seattle
W. W. Stewart.....	Chehalis
A. C. Brown.....	Vancouver
Cliff Ackley.....	Winlock

In connection with the activities of the department in the eradication of tuberculosis it is believed that the following excerpt from the report of the Chief of the Bureau of Animal Industry for the fiscal year ending June 30 is of great value to the livestock raiser:

"The observations made in the course of the year, like those made at the station for approximately a dozen years, have again emphasized the great value of scrupulous cleanliness as an aid in fighting the spread of tuberculosis among domestic animals.

"Tests made with domesticated white and wild gray mice proved that their bodies may harbor enormous numbers of tubercle bacilli months after they have been permitted to eat fresh tuberculous material on only one day. The tuberculous material fed in the tests contained bovine types of tubercle bacilli, and it is not known whether human types would give similar results. The mice not only harbor the bacilli in their bodies but expel them freely through their bowels with their feces in gradually increasing numbers. Microscopic preparations of the lungs of mice made six months after they had eaten the tuberculous material often look like smears from pure cultures of tubercle bacilli. Mice which had eaten tuberculous material on only one day were fed three to five months later to a number of hogs, one hog receiving only a single mouse, another two mice, another three, and another four. All four hogs were found to be affected with tuberculosis approximately three months later, and the disease was either completely generalized or rapidly spreading.

"The tests formed a part of a series of investigations undertaken to find an explanation for the recurrence of tuberculosis in originally tuberculous, cleaned herds of cattle. Such recurrence is not uncommon, and is usually attributed to inadequate disinfection of premises or some other cause which can not be accepted as satisfactory in the light of our observations. If the common gray mouse, which is very abundant in our stables, can become a carrier of tubercle bacilli by eating tuberculous material on only a single day, and remain a carrier and disseminator of tubercle bacilli for months, it is urgently necessary in our attempts to disinfect stables which have harbored tuberculous animals to include the extermination of mice. Tubercle bacilli expelled on feed from the bodies of infected mice probably are more dangerous

than those which are adherent in masses of dung on the walls of stables or those which have been trampled into the floor."

During the past biennium the United States Bureau of Animal Industry has supplied this department with 31,500 cubic centimeters of subcutaneous tuberculin, which has been distributed to local veterinarians.

During the four months following July 1st, 1918, there have been received and distributed 3,000 doses of this biological product.

INDEMNITY FROM UNITED STATES GOVERNMENT.

The 1919 agricultural appropriation bill which has been passed by congress contains an item providing for the payment of indemnities to owners of cattle destroyed on account of tuberculosis. To secure this indemnity the state in which the cattle are kept must have a working co-operative agreement and must pay an equal amount to the owner, and in no case will the federal government pay an amount in indemnity in excess of that paid by the state. The federal government will pay one-third of the difference between the appraised value of the cattle and the salvage value of the slaughtered animals. No indemnity payment is to exceed \$25.00 for a grade animal or more than \$50.00 for any pure-bred animal. Our state laws provide that we pay not more than \$35.00 in indemnity for an animal showing lesions of tuberculosis. The compensation from the state added to that of the United States Department of Agriculture will no doubt have the effect of removing some of the opposition that we now meet in this work, but some changes are necessary in our laws relating to this disease so that the owners of destroyed tubercular cattle may receive federal aid.

SUMMARY OF TUBERCULIN TESTS PREVIOUS TO CREATION OF THE STATE DEPARTMENT OF AGRICULTURE.

	Number Herds Tested	Number Animals Tested	Number Reactors
1895-1896.....	3	28	1
1896-1898.....	1	16	5
1898-1900.....	9	40	8
1900-1902.....	14	387	71
1902-1904.....	36	340	40
1904-1906.....	97	1,456	268
1906-1908.....	115	2,828	352
1908-1910.....	316	9,310	1,317
Totals.....		14,405	2,062

1910-June 10, 1913—No report.

TUBERCULIN TESTS UNDER STATE DEPARTMENT OF AGRICULTURE.

	Number Herds Tested	Number Animals Tested	Number Reactors
June 10, 1913, to June 30, 1914.....		6,562	349
July 1, 1914, to June 10, 1915.....	513	11,280	1,106
June 10, 1915, to June 30, 1916.....	2,292	28,930	1,954
July 1, 1916, to June 30, 1918.....	3,866	48,852	1,896
Totals.....		95,624	5,305

**TUBERCULIN TESTS CONDUCTED BY THE DEPARTMENT OF AGRICULTURE,
JULY 1, 1916, TO JUNE 30, 1918.**

COUNTIES	Number Herds Tested	Number Cattle Tested	Number Healthy	Number Diseased	Number Suspects	Number in Quarantine	Percentage of Diseased Cattle
Adams.....	4	74	74				
Asotin.....	1	24	24				
Benton.....	174	918	914	4			.43%
Chelan.....	11	119	104	15		5	12.6 %
Challam.....	11	188	188				
Clarke.....	101	1,666	1,544	114	8	6	6.84%
Columbia.....	1	1	1				
Cowlitz.....	17	812	804	8		7	2.56%
Douglas.....	1	2	2			2	
Ferry.....							
Franklin.....	9	208	204	4		1	1.92%
Garfield.....							
Grant.....	73	744	715	29		4	3.89%
Grays Harbor....	147	1,984	1,902	28	4	2	1.44%
Island.....	11	222	206	14		2	6.31%
Jefferson.....	14	363	351	12		6	3.31%
King.....	666	8,867	8,346	492	29	141	5.55%
Kitsap.....	6	87	70	16	1	3	18.28%
Kittitas.....	16	814	683	128	3	56	15.72%
Klickitat.....	11	32	28	4			12.50%
Lewis.....	198	2,011	1,941	62	8	14	3.06%
Lincoln.....	76	662	659	3			.45%
Mason.....	8	182	182				
Okanogan.....	50	379	355	24		1	6.33%
Pacific.....	16	513	508	3	2	2	.59%
Pend Oreille....	12	49	48	1		1	2.04%
Pierce.....	231	3,912	3,769	138	5	48	3.53%
San Juan.....	2	23	22	1			4.34%
Skagit.....	60	958	813	130	15	3	13.57%
Skamania.....	1	5	5				
Snohomish.....	519	5,584	5,414	157	13	55	2.81%
Spokane.....	161	2,752	2,708	44		9	1.60%
Stevens.....	105	1,091	1,089	2			.18%
Thurston.....	264	3,322	3,213	104	5	1	3.13%
Wahkiakum.....	335	4,326	4,167	159		31	3.67%
Walla Walla.....	112	1,302	1,294	7	1	2	.54%
Whatcom.....	361	3,985	3,803	171	11	4	4.29%
Whitman.....	14	408	408				
Yakima.....	67	818	796	22		5	2.69%
Totals.....	3,866	48,852	46,851	1,896	105	411	3.88%

**TESTS REPORTED BY VETERINARIANS NOT IN DEPARTMENT, JULY 1, 1916,
TO JUNE 30, 1918.**

COUNTIES	Number Herds Tested	Number Cattle Tested	Number Healthy	Reactors	Suspects	Percentage of Diseased Cattle
Benton	1	1	1			
Chelan	2	10		10		100.00%
Clarke	23	373	354	19		5.09%
Cowlitz	7	220	212	8		3.64%
Douglas	1	2		2		100.00%
Franklin	1	14	13	1		7.14%
Grant	6	114	96	17	1	14.91%
Grays Harbor	4	104	96	8		7.69%
Island	8	155	142	13		8.39%
Jefferson	8	82	70	12		14.63%
King	631	7,723	7,304	399	20	5.17%
Kitsap	5	86	74	11	1	12.79%
Kittitas	11	692	570	119	3	17.19%
Klickitat	1	6	3	3		50.00%
Oranogan	2	6	6			
Pend Oreille	1	2	2			
Pierce	60	887	849	36	2	4.06%
San Juan	1	1		1		100.00%
Skagit	20	261	223	35	3	13.41%
Snohomish	25	453	331	67	5	14.79%
Spokane	18	802	843	19		2.20%
Stevens	2	11	11			
Thurston	2	6	5	1		16.67%
Wahkiakum	2	249	225	24		9.64%
Whatecom	24	381	329	50	2	13.12%
Whitman	2	35	35			
Yakima	8	63	50	13		20.63%
Totals	876	12,799	11,894	868	37	6.79%

TUBERCULOSIS-FREE ACCREDITED HERDS.

At a meeting of the United States Livestock Sanitary Association, held in Chicago, December 3, 4, 5, 1917, uniform methods and rules for tuberculosis-free accredited herds of pure-bred cattle were unanimously adopted by the association and representatives of pure-bred cattle breeders' associations, and were approved by the United States Bureau of Animal Industry. The work had been carried on in this state by the department, as outlined in the second biennial report. Following the adoption of uniform rules by the states and federal government, the Bureau of Animal Industry took up the work in this state in co-operation with the department. Many of our pure-bred breeders have taken advantage of the provisions of the agreement and have subjected their herds to inspection and test. A copy of this agreement is appended herewith:

Whereas, The Bureau of Animal Industry of the United States Department of Agriculture and the Washington State Department of Agriculture, for the purpose of improving the pure-bred dairy and beef breeds of cattle in the United States, encouraging recognition of the importance of maintaining herds of such cattle free from tuberculosis, and promoting the interchange of healthy pure-bred cattle, proposes, so far as available funds permit, to co-operate with the breeders of pure-bred cattle, by assisting them to eradicate tuberculosis from their herds and to maintain officially tuberculosis-free accredited herds.

Now, Therefore, In consideration of receiving assistance from the Bureau of Animal Industry and the Washington State Department of Agriculture along the lines and for the purposes specified, I, ...

do hereby agree to co-operate with the said bureau and state officials upon the following terms:

1. I will permit my entire herd, or any cattle of my herd, to be examined and to be tuberculin tested or retested at such times as are considered necessary by the bureau and state officials.

2. I will cause all animals which show physical evidence of tuberculosis to be promptly slaughtered under the United States meat inspection regulations, and I will cause the carcasses of said animals to be disposed of according to the meat inspection regulations of the Bureau of Animal Industry and state laws, based upon the lesions found upon post-mortem inspection.

3. All animals which react to the tuberculin test, but which show no physical evidence of tuberculosis, shall be removed from the herd and shall be disposed of as recommended by the bureau or state officials.

4. It is agreed that quarantined reacting bulls may be used for breeding, provided they are held upon the staff, their sexual organs properly disinfected, and the cow restrained by some suitable method so as not unnecessarily to be exposed to tuberculosis from the bull or infected premises.

5. I will cause, in all cases where the milk or milk products from quarantined reacting cows are to be used for any purposes whatever, the said milk or products to be first submitted to pasteurization at not less than 150 degrees F. for not less than twenty minutes.

6. I will cause the calves from quarantined reacting cows to be removed from their mothers at birth, to be maintained upon premises free from infection with tuberculosis, and to be fed upon the milk of cows which have passed a satisfactory tuberculin test or upon the pasteurized milk of tuberculin reactors.

7. I will allow no cattle to be associated with my herd which have not passed a tuberculin test approved by the bureau or state officials. I will keep all new cattle separated from my herd pending the application of a tuberculin test by an inspector of the said bureau or state. I will notify the proper officials immediately, giving details of the identification, characteristics, and records of tuberculin tests of any cattle which may be added to my herd.

8. I will subject any premises contaminated by tuberculous animals, as indicated by a physical examination or a tuberculin test, to a thorough cleaning and disinfection, at my expense, under the direction or supervision of the bureau or state officials. I will comply with all reasonable sanitary measures and other recommendations for the control of tuberculosis.

The following uniform methods and rules for tuberculosis-free accredited herds of pure-bred cattle, having been adopted by all parties concerned, are entered as a part of this agreement:

1. A tuberculosis-free accredited pure-bred herd is one which has been tuberculin tested by the subcutaneous method, or any other test approved by the Bureau of Animal Industry, under the supervision of the Bureau of Animal Industry, or a regularly employed veterinary inspector of the state in which co-operative tuberculosis eradication work is being conducted jointly by the United States Department of Agriculture and the state. Further, it shall be a herd in which no animal affected with tuberculosis has been found upon two annual or three semi-annual tuberculin tests, as above described, and by physical examination.

2. The entire herd, or any cattle in the herd, shall be tuberculin tested or retested at such time as is considered necessary by the federal and state authorities.

3. No cattle shall be presented for the tuberculin test which have been injected with tuberculin within sixty days immediately preceding or which have at any time reacted to a tuberculin test.

4. No herd shall be classed as an accredited herd in which tuberculosis has been found by the application of the test, as referred to in paragraph 1, until such herd has been successfully subjected to two consecutive tests with tuberculin, applied at intervals of not less than six months, the first interval dating from the time of removal of the tuberculous animal from the herd.

5. Prior to each tuberculin test satisfactory evidence of the identity of the registered animals shall be presented to the inspector. Any grade cattle

maintained in the herd, or associated with animals of the herd, shall be identified by a tag or other marking satisfactory to the state and federal officials.

6. All removals of registered cattle from the herd, either by sale, death, or slaughter, shall be reported promptly to the said state or federal officials, giving the identification of the animal and, if sold, the name and address of the person to whom transferred. If the transfer is made from the accredited herd to another accredited herd, the shipment shall be made only in properly cleaned and disinfected cars. No cattle shall be allowed to associate with the herd which have not passed a tuberculin test approved by the state and federal officials.

7. All milk and other dairy products fed to calves shall be that produced by an accredited herd, or, if from outside or unknown sources, it shall be pasteurized by heating to not less than 150 degrees F. for not less than twenty minutes.

8. All reasonable sanitary measures and other recommendations by the state and federal authorities for the control of tuberculosis shall be complied with.

9. Cattle from an accredited herd may be shipped interstate, by certificate obtained from the office of the state livestock sanitary officials of the state in which the herd is located or from the office of the Bureau of Animal Industry, without further tuberculin test for a period of one year, subject to the rules and regulations of the state of destination.

10. Strict compliance with these methods and rules shall entitle the owners of tuberculosis-free herds to a certificate, "Tuberculosis-Free Accredited Herd," to be issued by the Bureau of Animal Industry and the state livestock sanitary authority. Said certificate shall be good for one year from date of test unless revoked at an earlier date.

11. Failure on the part of owners to comply with the letter or spirit of these methods and rules shall be considered sufficient cause for immediate cancellation of co-operation with them by the state and federal officials.

My herd is composed as listed below:

Breed.....	Pure-Bred	Grade	Total
Females over six months old.....			
Males over six months old.....			
Calves under six months old.....			

In witness whereof I have signed this agreement this.....day
of....., one thousand nine hundred and....., Owner.

Address.....

Witness:

List of Washington herds officially accredited as free from tuberculosis and of herds that have passed successfully one test with a view to certification:

Name and Address	Once Tested		Accredited	
	Without Reactors	Pure-bred Grade	Pure-bred Grade	
AYRSHIRE.				
E. M. Chandler, Yakima.....	7	..	..	..
GUERNSEY.				
A. L. Gile, Chinook.....	..	..	50	60
HOLSTEIN-FRIESIANS.				
A. Benson, Lynden.....	25	..	..	..
Carnation Stock Farm, Seattle.....	350	..	..	..
Charles Peabody, Seattle.....	90	..	..	..
A. E. Smith, Sumas.....	100	..	..	..
Byron A. West, Mount Vernon.....	17	..	..	..

The above names are copied from List No. 1 of the tuberculosis eradication division, Bureau of Animal Industry, issued July 1, 1918. This list does not comprise the total number of tuberculosis-free herds of the state. It merely names those herds which have been tested under the co-operative agreement and have passed one or more tests without reactors.

GLANDERS.

Glanders continues to be reported from time to time, particularly from that portion of the state lying east of the Columbia River. The disease is usually found in its most virulent form where large numbers of horses are kept. This condition exists in the wheat belt of the state, and as a general mallein testing campaign has never been conducted, there are centers of infection scattered throughout that region.

Mallein, which is used in the diagnosis of this disease, is supplied to this department by the United States Bureau of Animal Industry. This division distributes it without charge to the practitioners of the state. The opthalmic test has been used during the past few years, as this method has been found more reliable than the old subcutaneous method and is much easier of execution than the subcutaneous, especially when applied to unbroken range horses.

Following the testing of horses for this disease, it has been the policy to immediately destroy the reactors. Wherever doubt as to the correctness of the test exists, samples of blood serum of the suspected horse are forwarded to the pathological division, United States Bureau of Animal Industry, Washington, D. C., where a complement fixation test is made and the final diagnosis sent this office.

Cleaning and disinfection of the premises are carried out under the supervision of the veterinary inspector. Contact animals are traced and the test applied.

The slaughter of many of the reacting horses often works a hardship on the farmer. This is especially true when the animals are being used during the planting and cropping seasons. In some cases it has been deemed advisable to quarantine the farm and allow the owner the use of apparently healthy horses until arrangements could be made to replace the diseased horses. A frequent complaint from horse raisers is brought about because no indemnity is allowed owners of destroyed glandered stock, while the cattle owner receives compensation for slaughtered tubercular bovine animals. It would appear that indemnity could be allowed in these cases, as it undoubtedly would have the effect of bringing about a more prompt disposal of diseased animals. This would mean that in some instances time and money now being spent on these cases would be saved.

Glanders is a serious problem in the marketing of horses. During the past two years the federal government has been purchasing horses throughout the country, but due to outbreaks of this malady in many of the remount stations, unusual precautions are now being taken to buy horses from districts in which the disease is not known to occur.

Following is a summary of the work done by the department during the biennium; also the report of cases handled since that time:

HORSES TESTED FOR GLANDERS, JULY 1, 1916, TO JUNE 30, 1918.

COUNTIES	Number Herds Tested	Number Healthy	Number Diseased	Number Suspects	Number Slaughtered	Percentage of Reactors
Adams.....	55	55				
Benton.....	1	1				
Clarke.....	1	1				
Columbia.....	102	96	4	2	4	8.92%
Cowlitz.....	1		1		1	100.00%
Douglas.....	3	8				
Garfield.....	86	81	5		5	18.89%
Grant.....	240	230	10		10	4.16%
Grays Harbor.....	26	20	6		6	23.04%
King.....	22	21	1		1	4.55%
Lewis.....	3	2	1		1	33.33%
Lincoln.....	135	135				
Okanogan.....	12	11	1		1	8.33%
Pierce.....	5	1	3	1	4	60.00%
Snohomish.....	1	1				
Spokane.....	1	1				
Stevens.....	12	12				
Walla Walla.....	480	439	36	5	41	7.50%
Whateom.....	1		1		1	100.00%
Whitman.....	307	283	23	1	24	7.49%
Yakima.....	1		1		1	100.00%
Totals.....	1,445	1,343	93	9	100	6.44%

HORSES TESTED FOR GLANDERS, JULY 1, 1918, TO OCTOBER 1, 1918.

COUNTIES	Number Tested	Number Healthy	Number Diseased	Number Suspects	Number Slaughtered	Percentage of Reactors
Garfield.....	78	73	5		5	6.41%
Stevens.....	24	21	3		3	12.50%
Totals.....	102	94	8		8	7.84%

Horses Tested for Glanders.

Years	Animals Tested and Examined	Animals Reacting and Destroyed
1895-1896	138	15
1896-1898	34	20
1898-1900	53	46
1900-1902	156	41
1902-1904	238	24
1904-1906	967	107
1907-1908	1407	131
1909-1910	1698	255
1913-1914	1810	23
1915-1916	1234	114
1917-1918	1445	93

From July 1, 1916, to June 30, 1918, there were received from the United States Bureau of Animal Industry 8,300 doses of mallein, which have been distributed to the local veterinarians of the state.

During the period covered by the dates July 1, 1918, and November 1, 1918, there were 1,500 additional doses received and distributed.

HOG CHOLERA.

Hog cholera is the most serious disease of swine within the state. The germ which produces this disease has never been isolated, but it is known that the excretions and blood of infected swine are highly contagious and for this reason it is desirable to remove at once all well animals from those showing symptoms of disease and to have all hogs treated immediately with anti-hog cholera serum.

The losses from this disease during the first year of the biennium were light, but during the summer of 1918 there appeared to be an increase in virulence and a general spread of the disease throughout the state. Washington does not maintain an anti-hog cholera serum plant, but a contract has been made with one of the biological manufacturing firms to supply this department with anti-hog cholera serum at the rate of 1½ cents per cubic centimeter. To secure the benefits of this rate, the serum must be secured by a veterinarian who is approved by this department.

One of the accessory causes of this disease is the transportation of swine through infected stockyards. This should be borne in mind by all intending purchasers. A regulation of this department requires that hogs, which have been received from other states, having passed in transit through public stockyards, shall be held in quarantine for at least three weeks at destination.

Upon receiving a report of hog cholera, an investigation is made and if the disease is found to be present, a quarantine is issued, the owner is advised regarding the care of his animals and measures are instituted to clean up the premises.

The interest which the local practicing veterinarians have taken in this work has been conducive to much good and has in many cases resulted in the conservation of much valuable food for the nation.

*Doses of serum and virus recommended:

DOSES OF SERUM.

<i>Weight of Swine</i>		<i>Dose of Serum</i>
20 to 40 pounds	30	cubic centimeters
40 to 60 pounds	30 to 40	cubic centimeters
60 to 90 pounds	40 to 50	cubic centimeters
90 to 120 pounds	50 to 60	cubic centimeters
120 to 150 pounds	60 to 70	cubic centimeters
150 to 180 pounds	70 to 80	cubic centimeters
180 pounds and over	80 to 100	cubic centimeters

DOSES OF VIRUS.

<i>Weight of Swine</i>	<i>Dose of Virus</i>
20 to 40 pounds	1 cubic centimeter
Over 40 pounds	2 cubic centimeters

RABIES OR HYDROPHOBIA.

A conservative estimate of the livestock losses from this disease for the past three years is placed at \$100,000.00.

Since the last report of this department was written, there has been a change in our laws relative to the quarantine measures affecting this disease. The legislative measures enacted during the session of 1917 are appended, but it has been found that the local authorities do not in most instances enforce the quarantine.

*Amendment 3 to Bureau Animal Industry Order 245, effective January 2, 1918.

Heads of animals suspected of being affected with rabies have been sent to the Washington State Board of Health, Seattle, and to the veterinary department of the Washington State College, where examination has been made to determine the presence of negri bodies. These bodies when found in the nerve cells in sections of the central nervous system are diagnostic of the disease.

We are appreciative of the courtesies and help extended to us by these laboratories.

Rabies has been eradicated from many of the European countries by strict dog muzzling regulations. It is reasonable to presume that it could be held in control in this state by the enforcement of the same rules. We have, however, the coyote problem to contend with in Washington, and this factor must always be considered.

In a letter received from E. F. Averill, predatory animal inspector, United States Bureau of Biological Survey, the following information is given:

"According to the best information obtainable the outbreak of rabies among wild animals started either in Asotin County, Washington, or in Nez Perce County, Idaho, in 1910. In any event, the first rabid coyote of which we have any record appeared in Asotin County late in the fall of that year. Apparently it crossed into Wallowa County, Oregon, without spreading the disease in Washington. From the northwestern corner of Oregon it spread by means of domestic and wild animals in fan-shape until the entire Eastern Oregon and Southern Idaho section was affected. From these states it spread rapidly into California, Nevada and Utah.

It was not until the late summer or early fall of 1916 that any authentic reports of rabies were received from the State of Washington. Apparently the disease had been re-introduced into that state from Oregon by sheep dogs that accompanied flocks trailed across the state to the summer range in the national forests in Northern Washington, or by Indian dogs which accompanied their masters from the Umatilla reservation in Oregon to the Indian celebrations on the Yakima reservation in Washington early in the summer.

Though the disease has been prevalent in Oregon for a greater length of time than in any of the other western states, the heaviest losses have probably occurred in Nevada. Oregon's losses since the beginning of the outbreak have been variously estimated at from \$200,000.00 to \$1,000,000.00, while Nevada's loss for the winter and spring of 1915-16 is estimated at a half million."

The present methods of dog control are unsatisfactory. Aside from the rabies question, the wandering dog is the greatest menace to the farm production of wool and mutton and the development of this phase of the live-stock industry. For these reasons there is need for a state or federal law licensing dogs.

Following are the law and the quarantines concerning the control of rabies promulgated by the Commissioner during the past biennium:

Be It Enacted by the Legislature of the State of Washington:

Section 1. That section 3204 of Remington & Ballinger's Annotated Codes and Statutes of Washington be amended to read as follows:

Section 3204. Quarantine shall mean the placing and restraining of any animal or animals by the owners or agents in charge of them within certain enclosures described or designated by the commissioner of agriculture, the assistant commissioner of agriculture assigned to the division of dairy and livestock or any inspector of the Department of Agriculture, in writing, and if the quarantine shall be for the purpose of preventing the spread of rabies or hydrophobia, the notice shall be published in the official newspaper of the county or counties included in the quarantined area or if there be no such newspaper then in one newspaper circulating generally within such area, and

said notice shall contain a warning to the owners of dogs within the quarantined area to confine closely or to muzzle all such dogs to effectually prevent biting, and any dog found running at large in such quarantined area at any time after five days from the date of the publication of such notice or known to have been removed from or to have escaped from such area, not being muzzled as aforesaid, may be shot or otherwise destroyed, by any person without liability therefor.

Any owner or owners or agent who fails to comply with or wilfully violates or negligently allows such quarantine to be violated by the escape and running at large of quarantined animals shall be guilty of a misdemeanor.

Sec. 2. This act is necessary for the immediate preservation of the public peace, health and safety and shall take effect immediately.

Passed the Senate, January 25, 1917.

Passed the House, February 7, 1917.

Approved by the Governor, February 10, 1917.

Order No. 9.

STATE OF WASHINGTON.
DEPARTMENT OF AGRICULTURE.

To Whom It May Concern:

Whereas, The infectious disease rabies or hydrophobia has appeared in this state and is spreading with alarming rapidity, a proper safeguarding of the lives of the public demand that every effort be made to immediately check the progress of the dread disease fatal alike to livestock and human beings. As this infection is spread almost entirely by the bite of rabid dogs, it becomes of the utmost importance that every dog not closely confined be provided with and caused to wear at all times a muzzle of durable and safe construction until such time as the Commissioner of Agriculture is convinced that the danger is over.

NOTICE OF QUARANTINE.

The fact has been determined and notice is hereby given that a contagious, communicable disease, known as rabies or hydrophobia, exists in the State of Washington;

Now, Therefore, I, H. T. Graves, Acting Commissioner of Agriculture, under authority conferred by chapter 13, Laws of 1917, do hereby quarantine the entire counties of Spokane, Pend Oreille, Whitman, Garfield, Asotin, Columbia, Walla Walla, Franklin, Adams, Lincoln, Ferry, Stevens, Okanogan, Chelan, Douglas, Grant, Benton, Kittitas, Klickitat, and Yakima, and establish the following rules and regulations:

1. All dogs running at large within the boundaries of the counties herein specified shall be properly and securely muzzled so as to prevent their biting other dogs or animals.

Provided, That this rule shall not apply to dogs under leash or securely confined on the premises of their owner.

3. No dogs shall be transported or moved from the territory hereinbefore quarantined to any point outside the quarantined area unless permission has first been secured from the Commissioner or his authorized agent.

PENALTY.

Any owner, owners or agents who wilfully violate or negligently allow this quarantine or these rules and regulations to be violated shall be guilty of a misdemeanor and be punished by a fine of not more than two hundred fifty dollars (\$250.00), or be imprisoned in the county jail for not more than ninety (90) days.

Peace officers, under the provisions of section 5, chapter 100, Laws of 1915, are requested to assist in the enforcement of said quarantine rules and regulations, and any person is authorized under the provisions of chapter 13, Laws

of 1917, to destroy, without liability therefor, any dog not muzzled as herein provided and found running at large in the herein defined areas.

H. T. GRAVES,
Acting Commissioner of Agriculture.

Dated February 19, 1917.

Effective five days after date of publication.

Amendment No. 1 to Department of Agriculture Order No. 9, Modifying Quarantine Area.

(Effective July 9, 1917.)

The fact has been determined that the infectious disease known as rabies or hydrophobia, does not now exist in the counties of Walla Walla, Garfield, Columbia and Asotin, all being south of the Snake River.

Now, Therefore, I, E. F. Benson, Commissioner of Agriculture, under authority of law do hereby remove all quarantine restrictions heretofore placed upon said counties in the State of Washington, by the Department of Agriculture's Order No. 9, dated February 19th, 1917.

The effect of this order is to permit dogs in this area to go unmuzzled.

This amendment does not affect any part of the state east of the summit of the Cascade Mountains and north of Snake River, all of which area is still under Quarantine Order No. 9.

E. F. BENSON,
Commissioner of Agriculture.

Amendment No. 2 to Washington Department Order No. 9 releasing rabies quarantined areas. Effective August 30, 1917.

The fact has been determined by the Commissioner of Agriculture that the disease of rabies or hydrophobia is not now known to exist or exists to a slight extent only, in the State of Washington and especially in those counties of the State of Washington lying east of the Cascade Mountains and north of the Snake River, quarantined by Department Order No. 9, dated February 19, 1917, and effective five days after date of publication.

Now, Therefore, I, E. F. Benson, Commissioner of Agriculture, do release from quarantine the counties of Spokane, Pend Oreille, Whitman, Franklin, Adams, Lincoln, Ferry, Stevens, Okanogan, Chelan, Douglas, Grant, Benton, Kittitas, Klickitat and Yakima.

This amendment rescinds Order No. 9, and permits dogs in this area to go unmuzzled.

(Signed) E. F. BENSON,
Commissioner of Agriculture.

Order No. 10.

**STATE OF WASHINGTON.
DEPARTMENT OF AGRICULTURE.**

To Whom It May Concern:

Whereas, The infectious disease rabies or hydrophobia has appeared at various places in the counties of Kittitas, Yakima and Benton, in the State of Washington, and a proper safeguarding of the lives of the public demands that every effort be made to immediately check the progress of the dread disease, fatal alike to livestock and human beings. As this infection is spread almost entirely by the bite of rabid dogs, it becomes of the utmost importance that every dog not closely confined be provided with and caused to wear at all times a muzzle of durable and safe construction until such time as the Commissioner of Agriculture is convinced the danger is over.

NOTICE OF QUARANTINE.

The fact has been determined and notice is hereby given that a contagious, communicable disease, known as rabies or hydrophobia, exists in the State of Washington;

Now, Therefore, I, E. F. Benson, Commissioner of Agriculture of the State of Washington, under authority conferred by chapter 13, Laws of 1917, of the

State of Washington, do hereby quarantine the entire counties of Kittitas, Yakima and Benton, in said State of Washington, and establish the following

RULES AND REGULATIONS.

1. All dogs running at large within the boundaries of the counties herein specified shall be properly and securely muzzled so as to prevent their biting other dogs or animals.

2. No dogs shall be transported or moved from the territory hereinbefore quarantined to any point outside the quarantined area unless permission has first been secured from the Commissioner of Agriculture, or his authorized agents.

PENALTY.

Any owner, owners or agents who wilfully violate or negligently allow this quarantine or these rules and regulations to be violated shall be guilty of a misdemeanor and be punished by a fine of not more than two hundred fifty dollars (\$250.00), or be imprisoned in the county jail for not more than ninety (90) days.

Peace officers, under the provisions of section 5, chapter 100, Laws of 1915, are requested to assist in the enforcement of said quarantine rules and regulations, and any person is authorized under the provisions of chapter 13, Laws of 1917, to destroy, without liability therefor, any dog not muzzled as herein provided and found running at large in the herein defined areas.

E. F. BENSON,
Commissioner of Agriculture.

Dated November 27, 1917.

Order No. 11.

STATE OF WASHINGTON.

DEPARTMENT OF AGRICULTURE.

NOTICE OF QUARANTINE.

The fact has been determined and notice is hereby given that a contagious, communicable disease, known as rabies or hydrophobia, exists in the County of Franklin, in the State of Washington;

Now, Therefore, I, E. F. Benson, Commissioner of Agriculture of the State of Washington, under authority conferred by chapter 13, Laws of 1917, of the State of Washington, do hereby quarantine the entire area of Franklin County, in said State of Washington, and establish the following

RULES AND REGULATIONS.

1. All dogs running at large within the boundaries of Franklin County, Washington, shall be properly and securely muzzled so as to prevent their biting other dogs or animals.

2. No dogs shall be transported or moved from the territory hereinbefore quarantined to any point outside the quarantined area unless permission has first been secured from the Commissioner of Agriculture, or his authorized agents.

PENALTY.

Any owner, owners or agents who wilfully violate or negligently allow this quarantine or these rules and regulations to be violated shall be guilty of a misdemeanor and be punished by a fine of not more than two hundred fifty dollars (\$250.00), or be imprisoned in the county jail for not more than ninety (90) days.

Peace officers, under the provisions of section 5, chapter 100, Laws of 1915, are requested to assist in the enforcement of said quarantine rules and regulations, and any person is authorized under the provisions of chapter 13, Laws of 1917, to destroy, without liability therefor, any dog not muzzled as herein provided and found running at large in the herein defined areas, to-wit: Franklin County, Washington.

E. F. BENSON,
Commissioner of Agriculture.

Dated January 28, 1918.

FORAGE POISONING.

From time to time reports have been received that horses in the Walla Walla section had been dying from a strange malady. Dr. J. H. Martin of this department accordingly visited that district and, in company with Dr. J. W. Woods, made a field investigation of this disease. Following is his report:

Olympia, Washington, February 20, 1917.

Commissioner of Agriculture,
Olympia, Washington.

Dear Sir: Following instructions received from your office, I have made as full and complete an investigation of the outbreak of the peculiar disease in horses located in Walla Walla County as circumstances and apparatus would permit. This disease has been present in Walla Walla County several times during the past twelve or fifteen years, but perhaps did not appear on so many ranches as during the present outbreak; hence did not attract so much attention. This disease attacks both horses and mules, and may also prove fatal to cattle; however, but little evidence was secured indicating that fatalities had occurred among the cattle. I found this disease more or less prevalent on several of the ranches in the Dry Creek vicinity, and near Pleasant View, all in Walla Walla County. The fatalities numbered from two to fifteen head of horses on each ranch; but I did not think that all the fatalities were due to this particular disease—some having died from other causes.

The first cases of this disease have usually been observed during the late fall months, or early winter, and may be found throughout the winter season, or until the animals have been removed from the grain stubble, or from the straw stacks, upon which they have been subsisting. Occasionally cases of this disease may appear within a period of two or perhaps three weeks after the animals have been removed.

SYMPTOMS.

1. The symptoms are not uniform in the different cases, but the general appearance and line of symptoms follow in typical cases.
2. The first changed condition usually noticed is one of drowsiness, or dullness, when at rest; the head hanging and eyes almost or entirely closed.
3. The movement of the animal is unsteady, or irregular, showing wabbling gait.
4. This condition is often followed by restlessness, moving across the corral, or field, and then circling around, returning to same place—usually with a very unsteady gait, sometimes excited, not observing obstacles, as wire, or wire fences which may be in the path.
5. Usually among the first symptoms will be noticed a pinkish or reddish urine when voided changing in a few hours to a very deep red, then after one or two days becoming very dark or dark brown.
6. In more advanced stages the muscles of the face are drawn, with a jerking of the head and body muscles, and the lips are drawn apart.
7. Sometimes there is feed or straw in the mouth being partly chewed, or masticated, apparently forgetting to swallow.
8. The animal will stand with the legs bracing his body, and will lean against the fence, or against the stall if in the barn.

These are the most common symptoms; occasionally others are observed, and continued from one-half day to several days—sometimes a week or more before the animal dies. I am of the opinion that these animals show symptoms, probably of a nervous character, before any of these characteristic symptoms are shown, and it is only after considerable development of the disease process that anyone observes the condition signifying that there is something wrong with the animal.

POST-MORTEM FINDINGS.

The blood shows dark venous in appearance; there being no real red blood from the arteries, showing that the red corpuscles have been more or less destroyed—that is decomposed. The blood may have almost a tarry appearance, and is very slow to clot or coagulate; in some cases may not show any clot at all. The alimentary tract shows very little change that is noticeable to the unaided eye. The liver will show a bluish black color somewhat hardened and enlarged; the spleen is very dark, almost black, showing a hardened and leathery appearance; the kidneys show very dark red, the outer layer almost black.

CURE AND PREVENTION.

At the present time there is no known medicine or drug which may be administered giving any satisfactory results, after the animals have developed typical symptoms of the attack; hence the administration of drugs is not to be considered in connection with the disease.

The control of the disease lies in preventing the animals from consuming unwholesome forage. This unwholesome forage is found in the vicinity where this disease was present, consisting of straw, tar weed, and mustard, and some grain, which had been made wet or damp some weeks earlier. This forage contained quantities of mold and fungous growths found chiefly on the straw and chaff. The molds and fungi which causes this trouble are produced on the straw, weeds, grasses and grains only when the weather or climatic conditions are favorable for their growth. This growth will always occur during the continuance of a damp, sultry, atmosphere, and also if there have been rains, melting snows, followed by fairly warm days, during the autumn season. No serious trouble can arise in feeding this quality of forage, if it has not been exposed to this character of dampness, rains, or snows; hence it may be observed that an animal may subsist on this combination of feed when it does not contain these molds and fungous growths. It is evident that the best method of combating this disease lies in prevention. Moldy, improperly cured, fermented or damaged feed should not be given to horses, and a complete change of feed is of paramount importance if several of the symptoms are noticed as above enumerated.

Yours respectfully,

J. H. MARTIN,

State Veterinary Inspector.

CONTAGIOUS ABORTION.

(Bang's Bacilli Infection.)

Abortion disease is of first importance in this state. Large financial losses are suffered year after year. Although the disease has been the subject of much investigational work and the causative agent is known, we appear to be no nearer a solution of a rational method of effective treatment than before.

As the disease is of a chronic character and appears to be self-limiting, establishing an immunity, owners of cattle affected with this disease have been advised to retain the aborting animals in their herds, provided they are worthy of retention and otherwise appear to be healthy. Adding cattle from outside sources often adds fuel to the flames. The animals that have gone through the abortive period are much more liable to produce a strong living calf than susceptible cows which have not established an immunity.

In referring to immunity in this disease it should be kept in mind that the term is relative only. As far as present knowledge goes, it may be said that there is no absolute method of curing the disease or producing immunity. Carbolic acid, methylene blue, serums, bacterins and vaccines have been more or less popular at different times, but the department does not feel that the

success attained by the use of any of these agents is sufficient to warrant its recommendation by us. The sequelae, or morbid condition left after abortion may, and most often does, deserve the attention of a trained veterinarian. The most common of these complications are retained afterbirth, metritis and sterility. Animals affected with these conditions are often sold to the unsuspecting buyer who thereby introduces the disease into his own herd. It is plain that some regulatory control measures should be instituted, but the disease is so widespread, so chronic and insidious in character, that it is doubtful if a method of sanitary control can be placed in operation at this time. In lieu of a proper supervision over sales of cattle, it is respectfully suggested that there is need for a law requiring the seller of cattle to provide the buyer with a health certificate. Such a law would restrict the trading and sale of diseased bovine animals.

HEMORRHAGIC SEPTICEMIA.

This disease has been recognized in the state for many years, but during the period covered by this biennium has not given us much concern except in a few instances. Practically all of the cases found can be traced to shipments from public stockyards. In each case reported to the department, immunization treatment by the use of biologicals has been recommended as medicinal treatment has been found to be of little value. Young stock (cattle) appear to be most susceptible, but in some instances sheep have also been affected.

ACTINOMYCOSIS OR LUMP JAW.

A number of these cases are reported from time to time. Owners are advised to treat the affected animals or have them slaughtered under proper inspection.

BLACKLEG.

Black leg remains endemic in this state, and outbreaks of the disease are often reported. The important treatment is of a prophylactic nature. Every owner of susceptible livestock should keep them vaccinated.

During this biennium 17,950 doses of black leg vaccine have been distributed to veterinarians and cattle owners.

ANTHRAX.

Anthrax has been suspected in Skagit and King counties. Reports from specimens submitted to laboratories in Seattle indicate that an organism resembling bacillus anthracis has been found, but the diagnosis has not been confirmed by animal inoculations. This is a disease that may at some future time cause much livestock losses in our cattle districts, especially in overflowed and swamp land.

SHEEP SCAB.

In handling this troublesome disease we have enjoyed the co-operation of the United States Bureau of Animal Industry. Scabies of sheep has been becoming more prevalent throughout the west during the past two years, until there is reason to look with suspicion on all shipments of sheep from districts outside of the state.

Scab first made its re-appearance in the feed yards of the Union Meat Company at Lyle, Klickitat County. Since that time there have been sporadic outbreaks, as will be seen by a reference to the appended table.

The laws relating to the interstate movement of sheep provide that they shall be inspected by the state veterinarian after coming into the state. It is to be hoped that the force of veterinarians may be increased to the end that our present sheep laws may be enforced. It is doubtful if entire dependence can be placed on the inspection of lay county inspectors, and for that reason alone there is need for trained veterinary sanitarians of this department, who will supervise this class of work in their districts.

Sheep scab is one of the oldest known animal diseases. It is caused by the mite *psoroptes ovis*, which measures about 1-50 of an inch in length. These mites borrow into the skin, producing an irritation which causes the sheep to become restless. To relieve this irritation they rub, scratch and bite themselves. As the disease progresses scabs form and the wool falls out; finally the general condition of the sheep becomes affected; they become unthrifty and, if the disease is allowed to progress unhampered, death follows. These scab mites readily become transferred from one sheep to another. They work so insidiously that many more sheep are affected before the infestation is suspected.

Treatment is directed toward the destruction of the scab mite. When this is accomplished the disease is cured. This department recognizes certain proprietary dips used in the treatment of scab, which have the approval of the Bureau of Animal Industry. All "exposed" sheep are dipped once and "diseased" sheep are dipped twice, under the supervision of veterinarians of this department, or the bureau, or both. During the biennium 81,391 sheep were dipped for this disease, 48,000 being dipped twice.

Sheep scab is the greatest disease menace to the wool-growing industry, and at all times deserves our close attention. The sheep interests of the state, valued at about \$10,000,000.00, are entitled to protection. We are doing our utmost with the means at our command, but should we be visited by an epidemic of sheep scab, which would necessitate a general dipping and quarantine order for all sheep within the state, it would be wise to have an emergency fund on hand.

When sheep scab was discovered in Okanogan County in October, 1918, the following order was issued:

Order No. 12.

STATE OF WASHINGTON.
DEPARTMENT OF AGRICULTURE.
DIVISION OF DAIRY AND LIVESTOCK.

The fact has been determined, and notice is hereby given, that the contagious disease known as sheep scabies is now known to exist in Okanogan County.

Now, Therefore, I, E. F. Benson, Commissioner of Agriculture, under authority conferred on me by law, do hereby issue the following order, to-wit:

1. All sheep which are, or have been, exposed to the disease of sheep scabies shall be dipped once under the supervision of a veterinary inspector of the Department of Agriculture, or a veterinary inspector of the United States Bureau of Animal Industry, in a dip approved by the said Bureau of Animal Industry.

2. All sheep which are now affected with, or have originated from a flock in which scabies is known to exist, shall be dipped twice in a dip approved by the United States Bureau of Animal Industry, and such dipping shall be supervised by veterinary inspectors of this department or of the Bureau of Animal Industry.

3. All stockyards and stock cars in which sheep known to be affected with scabies have been quartered shall be cleaned and disinfected in a manner approved by the veterinary inspector in charge of this work, before again being used for the quartering or transportation of livestock.

4. For the purpose of this order all sheep which have been trailed, herded, driven or otherwise moved over the designated driveways of the Okanogan National Forest shall be considered exposed to the disease known as sheep scabies.

Done at Olympia, Washington, this 7th day of October, 1918.

E. F. BENSON,
Commissioner of Agriculture.

By R. J. DONOHUE,
Assistant Commissioner of Agriculture.

SCABIES IN SHEEP, SHOWING NUMBER AND LOCATION OF OUTBREAKS OF THIS DISEASE.

Date	Location	Owner Diseased Flocks	Reported by	Number Infected and Exposed	Origin of Infection
2-14-17	Lyle.....	Union Meat Co.....	E. C. Joss.....	11,259	Portland, Ore.
4-18-17	Vancouver.....	W. W. McBride.....	A. C. Brown.....	411	Oregon
5- 2-17	Seattle.....	{Stacy St. Stock Yards. Barton & Co.....	J. Madsen.....	3,000	Unknown
9-22-17	Woodland.....	W. W. McBride.....	E. C. Joss.....	281	Unknown
2-22-18	Lyle.....	Union Meat Co.....	E. C. Joss.....	9,982	Unknown
7-27-18	Okanogan Forest	E. S. Hubbard.....	P. T. Harris.....	30,000	Oregon (?)
6-27-18	Richland.....	E. S. Hubbard.....	L. O. Pelton.....	150	Oregon
10- 5-18	Okanogan Forest	{W. W. Hopkins..... Yakima Sheep Co..... Dipper Sheep Co..... Albert Treiber..... Archle Prior..... Robert Prior..... Thomas Drumheller.... Allan Drumheller.....	L. O. Pelton.....	58,000	Hubbard Sheep on Forest Driveway
9-15-18	Pateros.....	Peter K. Jess.....	} W. C. Dye.....	19	Hubbard Sheep at Pateros
9-15-18	Pateros.....	Oscar Miller.....		52	
9-16-18	Carlton.....	M. Chapman.....		5	
9- 3-18	Twisp.....	S. T. Miller.....		10	
10-15-18	Colville Indian Reservation....	{W. T. Albritton..... R. R. Glasco..... C. F. Flower.....	J. H. Martin.....	1,648	Hubbard Sheep

OTHER DISEASES.

In addition to the diseases of livestock hereinbefore noted, there are many diseases reported to the department which, upon investigation, prove to be due to some cause other than infection or contagion.

While we do not care to handle work which should be done by the private veterinary practitioners of the state, we find it is often advisable that we investigate such conditions wherever practicable, although we have not thought it to be our duty to treat such cases. If such treatment were carried out by us the department would be placed in the position of handling general veterinary practice—something we do not feel it our duty to do—and although

there may be complaints made in cases where we refuse assistance, we feel that such complaints are unwarranted. This department should not render service for the individual, unless by so doing the public welfare is protected.

ACKNOWLEDGMENT.

It is felt that much credit for the general health of the livestock of the state is due to the veterinarians who are in private practice. These men have shown at all times a willingness to co-operate with and aid the department in the control and eradication of livestock diseases. We acknowledge our appreciation.

Respectfully submitted,

R. J. DONOHUE,

Chief, Division of Dairy and Livestock.

WASHINGTON STATE BOARD OF VETERINARY MEDICAL EXAMINERS.

E. F. Benson, Olympia, Commissioner of Agriculture, Ex Officio President of the board.

Dr. J. T. Seely, 1101 Westlake Avenue, North, Seattle.

Dr. W. D. Garratt, prior to November, 1918, Puyallup.

Dr. Robert Prior, subsequent to November, 1918, Yakima, Wash.

Under the veterinary practice act passed by the legislature of 1907 a provision was made for a board of veterinary medical examiners, consisting of a president, secretary, and treasurer.

The function of the board is to examine applicants who desire to practice their profession in the State of Washington. The examination embraces the following subjects: Anatomy, Physiology, Histology, Bacteriology, Surgery, Hygiene, Sanitation, Practice of Medicine, Contagious Diseases, Obstetrics and Parasitology.

The object is to increase the efficiency of the veterinary profession within the state by licensing practitioners who have the necessary learning and who are capable of administering to the wants of the livestock industry in an intelligent and conscientious manner; to obstruct the working of empirics and imposters who prey upon the uninformed, rendering a service, in many instances based upon fallacy and really harmful, for it imbues the unsuspecting stockman with a sense of security when in reality he is in danger of serious financial loss.

The appropriation for the maintenance of this board is \$1,000.00 for the biennium, but due to the fact that the expenditures are limited to the income, it is in reality self-sustaining.

The following is a complete list of all graduate veterinarians licensed to practice in the State of Washington:

Name—	Last Known Address.
Ackley, C.	Kelso
Badeley, J. C.	Walla Walla
Bailey, J. Hess	Palouse
Baker, E. T.	Moscow, Idaho
Baker, R. E.	Wenatchee
Baynes, C.	Tacoma
Beletski, T.	Wasco, Ore.
Bigerell, G. W.	Fairfield
Bestul, R. J.	Grants Pass, Ore.
Booton, L. R.	Tekoa
Bogart, E. A.	Centralia
Boyles, R.	Colton
Brown, D. W.	Battleground

Name—	Last Known Address.
Brown, S. L.	Newburg, Ore.
Brown, L. A.	Oregon
Brown, O. S.	Edwall
Brown, A. C.	Vancouver
Bullivant, J.	Spokane
Button, R. A.	Tacoma
Button, A. I.	Kent
Button, O. G.	Tacoma
Buzard, A. E.	California
Calkins, F. P.	Michigan
Carstensen, C.	Davenport
Cassels, F. H.	British Columbia
Close, F. W.	Lewiston, Idaho
Clark, G. W.	Yakima
Clark, A. E.	Oakesdale
Clark, R. D.	Deceased
Cornwall, O. L.	Almira
Cozier, Carl	Bellingham
Copess, S. A.	Deceased
Couits, R.	Alaska
Cramer, E. J.	Kent
Crouse, A. E.	Rosalia
Cummings, E.	British Columbia
Craft, A. E.	Sunnyside
Damman, A. J.	Vancouver, B. C.
Dinse, A. J.	U. S. B. A. I., Texas
Dirstine, P. H.	Pullman
Donaghue, J. A.	Ritzville
Donohue, R. J.	Olympia
Doty, R. B.	Seattle
Drake, E. J.	South Dakota
Dunkan, G.	Deceased
Edmonds, E.	Mount Vernon
Ehner, E. H.	Sunnyside
Ells, F. C.	Spokane
Elllott, T.	Uniontown
Evans, E. I.	Hartline
Fast, G. B.	Ritzville
Ferguson, W.	Goldendale
Fehr, G.	Deceased
Fisher, A.	Georgetown
Fleming, R. J.	Palouse
Ford, J. A.	Sumas
Foster, S. B.	Portland, Ore.
Fullington, H. C.	Seattle
Fettridge, R.	Kent
Garratt, W. D.	Puyallup
Galbraith, A. R.	Garfield
Gibson, J. D.	British Columbia
Gilchrist, A. W.	Deceased
Gilliam, R. L.	Fairfield
Glaizer, W. V.	Tacoma
Glaizer, E. L.	Tillamook, Ore.
Glenn, V. D.	Montesano
Goin, J. W.	Goldendale
Graves, H. T.	Puyallup
Griesinger, Edwin	Wilson Creek
Haggard, Finch	Seattle
Hammond, W. L.	B. A. I.
Harrington, D.	Sunnyside
Hayes, W. J.	Creston
Habecker, I. N.	Oregon
Hadley, F. B.	Madison, Wis.
Hart, W. G.	Tulare, Cal.
Hartnagel, O.	Seattle
Hauschild, T. B.	Kennewick
Heldring, J. L.	Deceased
Hess, O. B.	Washington, D. C.
Hickingbottom, R.	Seattle
Hickingbottom, R. J.	Seattle
Hilton, J.	Seattle
Hjort, Carl	Stanwood
Howard, J.	Stanwood
Howard, G. P.	St. Johns
Huff, L. B.	B. A. I., Iowa
Husband, A. F.	British Columbia
Hutchinson, E. N.	Lynden
Ickes, G. Z.	Palouse
Jackson, J. W.	Wenatchee
Jarvis, D. H.	Sandpoint, Idaho
Johnson, B.	Texas
Johnson, J. P.	Seattle

Name—	Last Known Address.
Johnson, Mark.....	Clarkston
Johnson, P. H.....	Colville
Johnson, W. J.....	Ethel
Jones, C.....	Yakima
Jones, G. A.....	Sedro Woolley
Kalkus, J. W.....	Pullman
Kellum, V. S.....	Seattle
Kennedy, E. D.....	Moscow, Idaho
Kennedy, H. F.....	Newport
Keown, H.....	Victoria
Knapp, H. S.....	Seattle
Kydd, W. H.....	Oregon
Knox, J. H.....	
Langdon, W. C.....	Waterville
LeMay, D.....	Fort Russell, Wyo.
Lloyd, T. J.....	Port Angeles
Lull, F. C.....	Ellensburg
MacIntosh, A. W.....	British Columbia
Mackintosh, P.....	Yakima
Martin, J. H.....	Spokane
Mason, F. H.....	Spokane
Mason, W. D.....	Utah
Mast, R. P.....	Pomeroy
Mawhinney, H.....	Harrington
Menig, O.....	Spokane
Miller, S. T.....	Twisp
Miller, W. N.....	Portland, Ore.
Mitten, James.....	Puyallup
Murray, J.....	McMinnville, Ore.
McAllister, R. C.....	Corvallis, Ore.
McBride, R.....	Everett
McCoy, E. E.....	
McCoy, J. H.....	Colfax
McCoy, M. M.....	B. A. I., Portland
McKibbin, J. A.....	Colfax
Nelson, R. S.....	Espanola
Nelson, S. B.....	Pullman
Nevel, B. E.....	Oregon
Nief, F. A.....	Deceased
Norman, C. T.....	Goldendale
Nye, E. W.....	Colfax
O'Donnel, M. J.....	Mansfield
Oderkirk, C. C.....	Wilbur
Oliver, K. M.....	Seattle
Osado, T.....	Seattle
Overhulse, G. F.....	B. A. I., Texas
Patric, L. A.....	Snohomish
Pauhlman, V. C.....	Prosser
Pelton, L. C.....	Seattle
Pfennings, H. E.....	Thorp
Phillips, C. S.....	Mount Vernon
Phinney, J. A.....	Deceased
Pickering, C. E.....	California
Picking, C. F.....	Vancouver, Wash.
Pike, F.....	Spokane
Powell, E. T.....	Idaho
Prior, Robt.....	Yakima
Ralston, W. E.....	Deceased
Reeve, R. A.....	Everson
Richards, W. R.....	
Richmond, H. A.....	Toppenish
Roberts, E. S.....	Blaine
Robillard, A. J.....	Seattle
Rogers, E. K.....	Spokane
Root, G. F.....	O'Brien
Ross, W. J.....	Mansfield
Rothlisberger, L. H.....	Colville
Rude, A. E.....	Davenport
Sandwith, C. J.....	Friday Harbor
Saperstein, A.....	Ferndale
Schader, C. H.....	Sunnyside
Schultz, C. H.....	Seattle
Seely, J. T.....	Seattle
Shaw, R. L.....	Deceased
Sheppard, G. F.....	Wapato
Sheppard, J. N.....	Wapato
Smith, F. E.....	Seattle
Stewart, W. W.....	Chehalis
Stickney, L. G.....	Toppenish
Stouder, R. W.....	Manhattan, Kan.
Strandberg, C. A.....	Monroe
Stratton, J. J.....	Spokane

Name—	Last Known Address.
Stuart, G. E.....	Spokane
Swingley, G. A.....	Seattle
Thompson, J. C.....	Pomeroy
Trippier, H. A.....	Walla Walla
Trotter, J. C.....	Rockford
Unbewust, G. A.....	Harrington
Unrau, G.....	Arlington
Weeks, H. S.....	Elma
Wegner, E. E.....	Pullman
Whitlow, E. T.....	
Wilson, W.....	Dayton
Woods, J. W.....	Walla Walla
Woodside, J. H.....	Redmond
Wright, C. C.....	Independence, Ore.
Yates, G.....	Seattle

DIVISION OF HORTICULTURE.

Honorable E. F. Benson,
Commissioner of Agriculture,
Olympia, Washington.

Dear Sir: In pursuance of the requirements of the horticultural code enacted by the 1915 session of the Washington state legislature, I herein submit to you a summary of the administration of the division by my predecessor and a report of the activities since my incumbency of the office as chief of the division, May 26, 1917.

The very efficient administration of the affairs of the division by Mr. T. O. Morrison was terminated by his resignation May 19, 1917, to accept a position with the Federal Land Bank at Spokane, Washington. No specific changes were made in the system of the work as carried on by Mr. Morrison.

The work of the division is divided into several classes:

1. Orchard work.

Demonstrative and educational work for the best insect and disease control.

Crop estimates.

State census of orchards.

Police work.

Disinfection and cleanup work.

2. Inspection.

Inspection of nurseries, nursery stock and the issuing of licenses.

Inspection of imported nursery stock and disinfection, or condemnation if necessary.

Inspection of apples for grade and pack.

3. Inspection of fruit and vegetables.

4. Inspection of incoming potato shipments.

5. Co-operative work with the Federal Bureau of Markets, the State College of Agriculture, and the State Marketing Division recommending federal grades of potatoes, and the inspection of same.

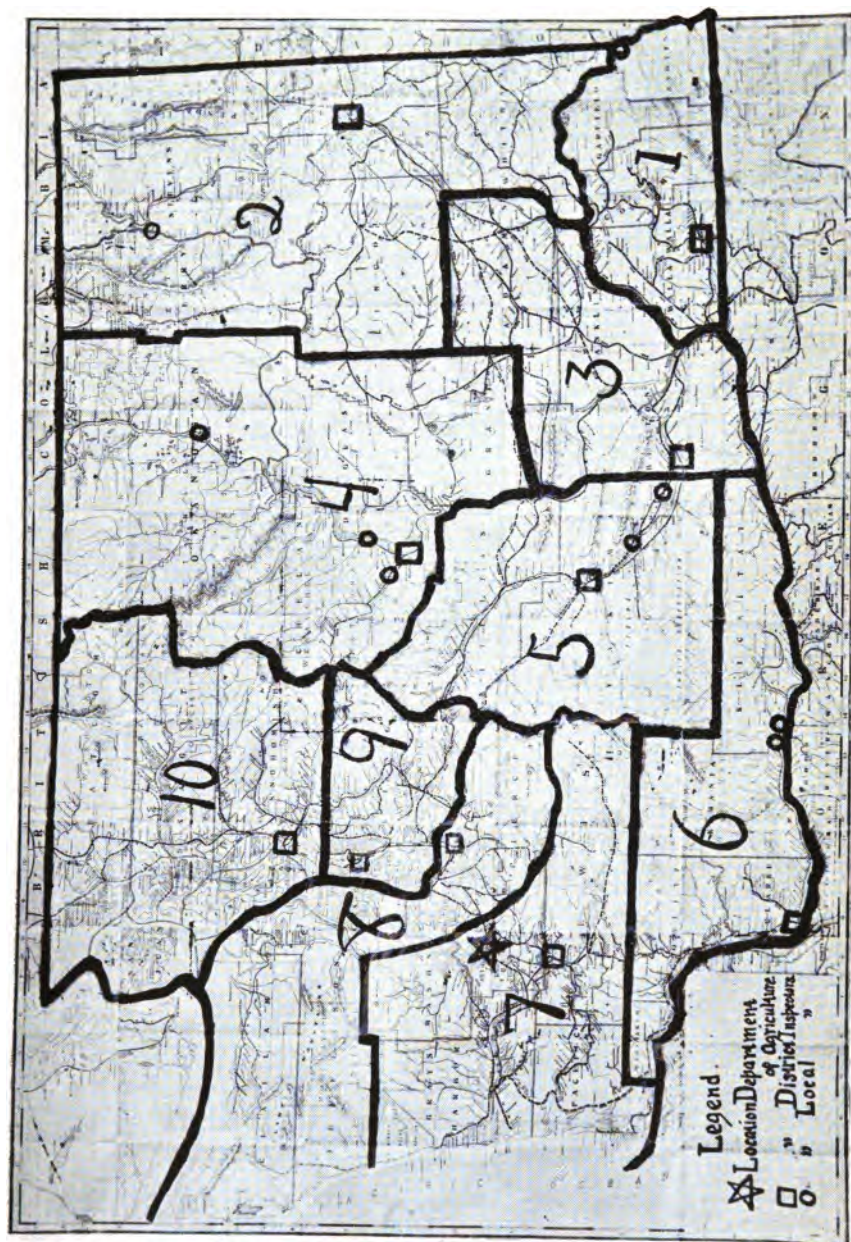
6. Adoption of state standard grade and pack rules.

7. Enforcement of the state insecticide and fungicide law.

HORTICULTURAL DISTRICTS.

The state is divided into ten horticultural districts, each district having one "inspector-at-large" who is the district inspector.

District No. 1 comprises the counties of Asotin, Columbia, Garfield, and Walla Walla. Harry L. Miller is the district inspector, located at Walla Walla. The fruit interests are varied in this district. At Clarkston and some other points on the Snake River are to be found some of the most desirable conditions for the growing of sweet cherries of any place in the state. Bing, Lambert, and Royal Ann are the leading varieties. Peaches and prunes are also quite successfully grown in this territory. The growing of small fruit could be greatly increased in this district if market and transportation facilities were improved. The leading apples grown in this section are the Rome Beauty,



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Delicious, and Jonathan. In the vicinity of Walla Walla is to be found the most extensive truck gardening interests of any section in the state, about 1,400 acres being devoted to the industry, onions ranking first in importance. Strawberries and other small fruits are grown in limited quantities in this territory. This section ranks second in the state from the standpoint of prune production. The Italian prune is second to apples in commercial importance. The leading varieties of apples grown in this section in the order of their prominence are Rome Beauty, Jonathan, Winesap, and Delicious. There are 532 acres of nuts in this district, more than half of which are in the Snake River territory.

District No. 2 comprises the counties of Ferry, Lincoln, Pend Oreille, Spokane, Stevens, and Whitman. The district inspector is E. B. Kelley, located at 503 Columbia Building, Spokane. District No. 2 is primarily an apple district, although some other of the tree fruits are grown with varied degrees of success. The one principal variety which predominates in this district is the Wagner; the largest planting being in the vicinity of Spokane. Rome Beauty is probably the next most popular variety. Strawberries are commercially grown in the vicinity of Spokane, but not in sufficient quantity to supply local demands. At Kettle Falls and some other points on the Columbia River in Stevens and Lincoln counties the orchard interests are of some commercial importance. Climate and soil conditions are good, but lack of transportation facilities handicaps these sections.

District No. 3 comprises Adams, Benton, and Franklin counties. Luke Powell is district inspector, located at Prosser. In this district is to be found the most extensive strawberry growing interests of any section in the state. Kennewick is the principal shipping point. Many of the European grapes are successfully grown in Franklin and Benton counties. This district is also one of the important peach sections in the state. With apples the Winesap takes the lead, Jonathan, Delicious, and Rome Beauty following in the order enumerated. There are, of course, many other varieties grown. Pears, prunes, plums, and cherries are very successfully grown in some parts of the district.

District No. 4 includes Chelan, Douglas, Grant, and Okanogan counties. P. S. Darlington is district inspector, located at Wenatchee. This district is the one district in the state which stands out as a strictly specialized, commercial fruit section, the principal territory being tributary to the Wenatchee, Okanogan, and Columbia rivers. Apples predominate, the leading varieties being Winesap, Jonathan, Delicious, Spitz (Esopus), Stayman; and Rome Beauty, ranking in the order enumerated. There are, of course, many other varieties grown, but the enumerated ones are the principal commercial sorts. This district is a leader in the production of apricots and produces many sweet cherries, peaches, and pears, but does not produce enough small fruit to supply local markets.

District No. 5 comprises Yakima and Kittitas counties. C. B. Wood is district inspector, located at Yakima. The Yakima Valley has the largest general production of fruit of any district in the state, and probably the fruit interests are more diversified than in any other section, due to the range of elevation from the bench lands of the Cascade Mountains in Kittitas County to the level of the Columbia River. Approximately 45,000 acres of land in Yakima County alone is planted to orchard. There are about 3,200 orchards which show an average of about 15 acres per orchard. The recent orchard census

taken by the department shows that there are more than 750,000 Winesap trees in the county, and 500,000 Jonathan, Rome Beauty, Newtown, and Delicious, ranking in the order named. The largest tonnage of pears in the state is grown in Yakima County. There are more than 400,000 pear trees in the county. There are also more than 300,000 peach trees in this district, making it the largest peach producing section in the state. Sweet cherries and prunes are also grown in commercial quantities.

District No. 6 includes Clarke, Cowlitz, Klickitat, Skamania, and Wahkiam counties. I. R. Fletcher is the district inspector located at Vancouver. In this district is to be found the principal prune producing sections in the state. Clarke and Skamania counties probably produce more prunes than are grown in the balance of the state. There are 258 driers in the district, having a daily capacity of 1,151 tons. In Klickitat County, in the vicinity of White Salmon and Underwood in Skamania County is to be found some very desirable apple sections. The Newtowns, Spitz (Esopus), and Delicious are the leading varieties. In this district almonds, filberts, English and American walnuts, and chestnuts are successfully grown in commercial quantities. In Clarke County figs are grown near Vancouver.

District No. 7 includes Grays Harbor, Lewis, Mason, Pacific, and Thurston counties. E. F. Perry is the district inspector, located at Chehalis. In this district is located Pacific and Grays Harbor counties, in which is to be found the principal cranberry interests of the state. The cranberry is indigenous in many places in Western Washington, but the leading commercial development of cranberry growing has been in Pacific and Grays Harbor counties. Cranberries grow wild in Massachusetts, New Jersey, Maine, New York, Michigan, Minnesota, Wisconsin, Washington, and a few other states.

In 1830 the cranberry became a cultivated commercial product in Lincoln, Mass. In 1845 it became a commercial enterprise in New Jersey. New York, Michigan, and Wisconsin supplied the markets with the berries from the wild bogs for many years, but today there are many acres of cultivated bogs to be found in these states.

In Western Washington the development of cultivated cranberry bogs started about 1880 and today in Pacific and Grays Harbor counties are to be found about 1,000 acres of bogs, 600 of which are in a good state of productiveness. In Pacific County the 1918 crop from about 400 acres is 40,000 boxes, about 40 pounds each, the capacity of the box being one-third of a commercial cranberry barrel. Present market prices range from \$4.00 to \$5.00 per box, which makes it a promising industry where conditions are favorable.

In the other counties of the district pears and small fruits are successfully grown when given good attention. In this district the wild blackberry grows profusely in the cut-over timber lands and is gathered in large quantities for canning factories. The local demand and canning factories consume the output from this territory.

District No. 8 includes Clallam, Jefferson, Kitsap, Pierce, and San Juan counties. Henry Huff is the district inspector, located at Sumner. In Pierce County is to be found the most important bush fruit growing section in the state, while the other counties produce limited quantities of the tree fruits, the surplus of which is consumed by the extensive canning plants located at Puyallup and Sumner. Grapes are grown very successfully in this district on some

of the islands located in the Sound. Probably more different varieties of apples and pears are grown in this district than any other part of the state.

District No. 9 is King County. F. N. Rhodes is the district inspector. He is located at 420 City-County Building, Seattle. Pears do especially well in many places in this district. Apples adapted to the coast conditions are grown successfully in many parts of the district. The Yellow Transparent, Duchess, Wealthy, Gravenstein, King, and Northern Spy are the most popular. Some of the islands in this district have been noted for the production of high grade fruit since the inception of fruit growing in the Northwest.

District No. 10 includes Skagit, Snohomish, and Whatcom counties. J. C. Eakle is district inspector. He is located at Seattle with Mr. Rhodes because the counties of that district have failed to make provision for an office in the district; hence he spends a part of the time assisting Mr. Rhodes and the balance in his district with headquarters at Bellingham. The commissioners of Snohomish County have recently made an appropriation for horticultural work and headquarters for this district will probably be transferred to Everett.

COUNTY INSPECTORS.

The provisions of the horticultural law are such that it is the duty of the commissioners of each county to levy an assessment upon the taxable property of their county to defray all expenses incurred for orchard inspection and other horticultural activities within the county. The appropriations in the different counties range from \$500.00 to nearly \$15,000.00. In the principal fruit valleys the number of local county inspectors is controlled by the size of the county appropriation, varying in number according to the horticultural activities in the different seasons of the year. The list of counties making appropriations for horticultural work is as follows:

Asotin
Chelan
Clallam
Clark
Columbia

Douglas
Garfield
Grays Harbor
King
Klickitat

Lewis
Mason
Okanogan
Pierce
Skamania

Snohomish
Spokane
Stevens
Walla Walla
Yakima

ORCHARD WORK.

The work in connection with the orchards is mainly in the nature of general inspection, watching for any outbreak of new diseases or insects or evidence of increased activity of the already present pests. This work naturally divides itself into educational work and police duties. The orchards of the state constitute, in the aggregate, such an immense area it becomes impossible for the district inspectors to give as close attention to each orchard as is necessary to secure the best results. Upon the discovery of any new pests or an increased activity of any of the old ones the owner is at once given information and demonstrations, if necessary, as to the best methods of treatment.

In the extensive commercial centers there is an increased demand for instruction of this kind, and the best trained horticulturists are needed for the work. Where the county appropriations are sufficient the inspection force is increased so that the orchards are given more attention by the local inspectors.

In the orchard work many meetings are held where problems pertaining to pruning, orchard care, and pest control are freely discussed. It has been the policy of the division for several years to each year test new spray materials and work out methods of their application, strength of mixtures, and the

proper time to apply them to get the best results. Spraying charts have been issued and generally distributed among fruit and vegetable growers, giving instructions as to when spraying for the different insects and diseases should be done, and what solutions should be used. Vegetable gardening is becoming a prominent enterprise in some parts of the state and much information on the control of the garden pests is given out.

EXPERIMENTAL WORK.

Through the courtesy of Mr. F. A. Frazier of the Niagara Spray Company, Niagara, N. Y., a dusting machine, together with a quantity of dusting material, was furnished to H. L. Miller of Walla Walla to be used for the control of aphids on the vegetable garden crops in that section. Where the dust was applied soon enough after infestation the results were very satisfactory.

The greater amount of the systematic experimental work done by the division was carried on by H. E. Waterbury of Yakima in the fifth district. The county commissioners of this county make such appropriations for horticultural work in the county that it enables the work to be done. Mr. Waterbury succeeded Mr. F. E. De Sellem, who resigned in May to accept a position with the Federal Bureau of Markets.

We quote from his annual report for Yakima County as follows:

Although experimental work is not mentioned in the horticultural laws of the State of Washington as a definite function of the horticultural inspectors, there are so many problems to be solved in the handling of which the State College has been unable to give assistance that, for the past three years, the inspector located at Yakima has done some work along this line with favorable and encouraging results. The work was begun in a small way, but has developed until it has become a considerable part of the local department program. Aside from the unquestioned need for such work there has been a real demand for it. If an experiment station should be located in the Yakima Valley in the near future, and there is little doubt that it will be, much of the work which we have taken upon ourselves will be taken over by it. Until that time, however, it seems advisable and even necessary to devote some time toward deciding the more important and perplexing problems to the best of our ability.

Heretofore the most comprehensive experiments have been those relating to codlin moth control. As a universal trouble maker, the codlin moth is without a peer, and it was felt that if even a slight advance could be made in control measures it would be of sufficient value to the fruit industry to compensate for the expense of any investigations which we would be able to make.

In 1916 the entire experimental tract in the Congdon orchards was devoted to codlin moth work exclusively, and in 1917 the greater part of the work was also along the lines of codlin moth control. In 1916, although no criticism could be made of the facilities placed at our disposal, nor with the splendid co-operation extended by the management of the Congdon orchards, there was, strange to say, one serious difficulty. The orchard surrounding the experimental plot was too clean, that is, the infection in that locality was not severe enough to make the test of the various materials a difficult one. This statement is supported by the counts made on the check plot which produced 80 per cent clean fruit with no spraying at all. To make the results more conclusive it was felt that plots should be selected in the lower valley where, on account of climatic conditions and the age of the orchards, the infestation is more severe. In addition it was decided that inasmuch as the codlin moth is not our only pest, part of the expenditure should be made in experimenting with control measures for some of the other pests and diseases. For this reason plans were made for experimenting with sprays for the powdery mildew and woolly aphids as well.

The codlin moth work was a continuation of the work done in 1916, and the points on which information was desired were as follows:

1. The relative efficiency of various strengths of arsenate of lead.
2. The relative efficiency of arsenate of lead paste, powdered lead arsenate, calcium arsenate, and nicotine sulphate.
3. The relative importance of spraying at different times during the season.
4. The relative efficiency of varying strengths of nicotine sulphate.
5. A comparison of arsenate of lead and distillate oil emulsion vs. nicotine sulphate with reference to the effect on both codlin moth and aphids.

Three experimental tracts were selected in the lower valley, the first containing approximately nine acres in the E. W. Ross orchard at Buena, the second containing approximately four acres in the orchard of R. B. McLeod in the Orchardvale district, three miles below Zillah, and the third, containing about one and one-half acres in H. C. Gest's orchard between Sunnyside and Emerald. The first tract consisted of trees ten years old of four varieties—Jonathan, Spitzenberg, Newtown and Winesap; in the second the trees are fifteen years old and of six varieties—Jonathan, Winesap, Newtown, Rome Beauty, Arkansas Black, and Stayman; in the third the trees are about twenty-five years old, and in the tract selected for the work all are Spitzenbergs. All these orchards have had a great deal of trouble with codlin moth. In the Gest orchard the writer has taken from a single band over 200 larvae at one time. While the other two orchards are not so badly infested, there is no doubt that codlin moth are present in sufficient quantities to make thorough and continuous spraying a necessity.

While all the codlin moth work was carried on below Union Gap because of the reasons given above, it was decided to locate the woolly aphid control work in the upper valley, not because the infestation there was any greater than in the lower valley, but because it is a more important economic problem in the upper valley than the codlin moth and the growers were more interested in it. For experimental purposes a plot containing 96 apple trees was selected in the orchard of S. B. Shiley in the Lower Naches. The varieties were Winesap, Jonathan, Winter Banana, and Delicious. The treatments planned were for the control of the root form of the woolly aphid as well as the aerial form.

It seems, however, that it was a mistaken enthusiasm which prompted us to locate our experimental tracts so far apart. The chief interest centered in the codlin moth experimental work, both on account of the larger and more elaborate schedule of experiments mapped out, and also because it was a continuation of previous work. Therefore, the woolly aphid experiments were neglected from time to time and much data which, without doubt, would be of value was lost. The changes in personnel of the experimental force, already referred to, which took the writer temporarily into private work and his successor into the army, left no one who was acquainted with the work, from its inception, and no one has had the opportunity to make continuous observations throughout the season. The result is that our conclusions are a patchwork of the observations of several different men, and any information published is necessarily a generalization.

For the experiments on powdery mildew we were fortunate in securing a plot containing 240 trees located in a Black Ben Davis orchard, belonging to S. M. McKee of Selah. This orchard had been very badly infected with mildew in 1916, many hundred boxes of apples being degraded or lost altogether. The effect on the fruit had been more marked than any heretofore observed in the Yakima Valley, as frequently from 25 to 75 per cent of the skin of the apple was roughened and russeted, giving it an appearance similar to frost injury. Unfortunately, what has been said of the woolly aphid experiments is also true to a less extent of powdery mildew experiments. Certain information was obtained which, we feel is of great value, and a start has been made which may lead to more important results another season.

In the spring of 1917, at the request of Mr. F. A. Frazier of the Niagara Sprayer Company, plans were made to try out the dust sprays which have been

attracting so much attention in the East and some parts of the West. The request came so late that it was impossible to incorporate this experiment with others in the lower valley, so the work was carried on in a small orchard inside the city limits of Yakima.

Codlin Moth Experimental Work in Ross Orchard.

Early in the season this tract was selected and divided into twenty-two plots, the varieties being divided as evenly as possible so that each plot had at least two varieties and most of them three. Each tree was tagged with a linen tag showing number of the tree and plot letter, and blue prints were made of the entire tract to avoid confusion among the men employed on the work. To avoid prejudice count trees were selected early in the season before any spraying was done, and during the season a record was kept of all thinnings and windfalls as well as of the harvested fruit. Out of a total of 530 trees on the entire tract, 114, or 21½ per cent, were selected as count trees, a larger percentage than is usually selected, and every apple from these count trees was picked, sorted, and counted under the direct supervision of the horticultural office. In sixteen of the twenty-two plots count trees were selected in such a way as to locate them at least fifty feet from any other plot with another row of trees intervening, making it almost impossible for spray which might be blown from another plot to affect them.

In the check plots which remained unsprayed throughout the season there was considerable variation. In the one adjoining the county road, where the dust was deep, the fruit was thickly coated with dust throughout the season and 40.96 per cent clean fruit was produced. The varieties on this plot were Winesap, Jonathan, and Yellow Newtown. In the other check plot which was composed entirely of Spitzenbergs, there was only 6.4 per cent clean fruit. This plot, however, was not exposed to the dust like the other check plot and so did not receive that protection.

The results of the spraying on the other plots was not at all satisfactory from the standpoint of clean fruit. Without doubt the greatest mistake was made when all of the plots were allowed to go unsprayed from the 23d of July to the 21st of August. At this time tens of thousands of worms were hatching and from the results of observations made, we are convinced that the greatest damage occurred between the 8th and the 21st of August. This is a lesson in itself, as it proves what should have been realized before, namely, that in the lower valley, where infestation is severe, the fruit cannot be kept clean if allowed to go unsprayed for nearly a month at that time of year. The lesson is even plainer to this particular case, for all the spraying done by the department was done by experienced men and was as thorough and painstaking as it could possibly be.

So far as these results have bearing on the experimental tests, the heavy infestation was a benefit rather than a detriment, for a clean orchard, as we have pointed out before, does not afford a satisfactory test of the efficiency of any spray. Whereas a serious infestation, like that encountered in this experiment, does give the experimenter a right to draw conclusions.

It will be noted that in our summary we have made a distinction between worms and stings. While we have taken into consideration the fact that any apple in any way damaged by codlin moth larvae has not received adequate protection, at the same time it must be admitted that the apple has received some protection and retains a commercial value, although it may be a diminished value. It is also of interest to note whether the proportion of stings will decrease as the proportion of worms decreases. In 1916, where the proportion of wormy apples ranged from 6 to 8 per cent, the proportion of stings was less than 1 per cent. In 1917, where the proportion of worms was 8 per cent, the proportion of stings was from 17 to 19 per cent.

Paste Arsenate of Lead—One Pound to Fifty Gallons of Water vs. Two Pounds to Fifty Gallons vs. Four Pounds to Fifty Gallons.

The results here appear to confirm the results obtained a year ago. In Plots A, B, C, and E we have basis for an excellent comparison. From the tabulated results it is clear that one pound of paste lead to fifty gallons of water is not sufficient to control codlin moth. Two pounds to fifty gallons shows about 20 per cent more clean fruit and, in turn four pounds to fifty gallons shows about 10 per cent more clean fruit than two pounds to fifty gallons, and 30 per cent more clean fruit than one pound to fifty gallons. However, the results on Plot E indicate that four pounds to fifty gallons is not necessary throughout the season, but that the beneficial results of the stronger solution are gained in the later applications. On Plot E, where two pounds to fifty gallons was used for the first three sprays and four pounds to fifty gallons for the last two, the results are very slightly inferior to those on Plot C where four pounds to fifty gallons was used throughout. For several years complaints have been made by growers in the Yakima Valley, particularly in the lower valley, that the codlin moth did most of its damage in the latter part of the summer. They also complained that at that season the lead seemed to have little effect on the young worms, even when the apples appeared to be coated. Their complaints were supported by the evidence, as many orchards which have had less than 1 per cent infection on August 1st have developed from 10 per cent to 50 per cent infection after that date, in spite of repeated spraying. We do not believe that the worms have in these instances eaten the poison and escaped death, even though only two pounds to fifty gallons were used. We do believe, however, that when the weaker solutions are used a thinner coating is left on the apples, a coating in which crevices appear more quickly, thus offering an entrance to the worm too minute to be apparent to the naked eye but plenty large enough for the tiny larvae. We hope to carry this test farther, as it promises to be one of the most important bits of information discovered in our work.

Relative Importance of Sprays Applied at Different Times During the Season.

We believed at the outset that no results of value would be obtained by applying only the calyx spray. Consequently this experiment was omitted. At the beginning of the season five sprays were the limit assigned to any one plot. Later in the season the program was changed slightly and six sprayings of lead made on one plot and seven on another. The results of the additional sprays did not appear in any marked degree to justify their application, although one additional spray, making six in all, would have been justified had it been applied early in August during the period already referred to as the period of heaviest infestation. While Plot T, with 82.52 per cent clean fruit, shows a much higher proportion of clean fruit than Plot B, for example, this must be discounted to a certain extent because Plot T, like one of the check plots, was located where the dust from the road had an opportunity to coat the apples heavily. On Plot K, where the dust was not a factor, there was only 6.7 per cent more clean fruit than on Plot B, which received two applications less.

On Plot J the calyx spray was omitted and five sprays applied afterwards. It will be noted that the percentage of calyx worms was high, 7.9 per cent, the percentage of side worms being 22.25 per cent. However, this plot had 5.65 per cent more sound fruit than Plot I, in which the third spray, often termed the "first intermediate spray," was omitted, four other sprays being applied. Any attempt to carry the deductions farther brings confusion, and we can only say that if we are to depend upon the results of these experiments as a guide, we would hesitate to omit any spraying in this district. Different results might be obtained where the infestation is light, but we are now dealing with a district where there is a continuous succession or, perhaps, procession, of worms from the time of the first hatch until cold weather sets in. The only safe method would be to apply the calyx spray, the first brood spray, the first intermediate spray, the second brood spray, and at least one, and possibly two, additional sprays at intervals of about fourteen to eighteen days, depending on

temperature and the way in which the young worms are hatching. After the second brood spray it would be necessary to make very careful observations.

Powdered Lead Arsenate.

Powdered lead arsenate justified its increased popularity. In our 1916 report we prophesied that the dry arsenate sales would increase very materially during the coming year. That they would make a gain of 1000 per cent was beyond belief, but by consulting our report on sales of spray material it will be seen that they did. While we have been glad to recommend the dry lead because of its better storage qualities and the greater ease with which it is handled in the field, we did not attempt to attribute to it any other qualities which would give it preference over the paste lead. However, our results not only in the Ross orchard, but in other experiments as well, indicate that the dry lead is more effective as a deterrent to the codlin moth. This is very evidently not due to any chemical differences, but is due, we think, to the fact that the powder stays in suspension better, not so much in the spray tank, where the artificial agitation should keep any lead in fair suspension, but after it has reached the fruit and foliage. This would give a more even coating. We have never taken much stock in complaints that certain brands of lead are chemically sub-standard, but we have believed, and still do believe, that there is a difference in the efficiency of leads, sometimes a very considerable difference, due entirely to their physical texture. If one pound of powdered lead equals two pounds of paste lead, the results on Plots B and D should be equal, providing always that all other contributing factors are equal. The tables show, however, that the powdered lead on Plot D produced over 14 per cent more clean fruit than the paste lead of equivalent strength, on Plot B. We do not wish to display any unwarranted enthusiasm for the powdered lead, but in addition to our own results we have already received the unsolicited testimony of over a score of growers. We would also call attention to observations made during the season which showed that the powdered lead was leaving a more even and a more readily discernible coating on the fruit than the paste.

Nicotine Sulphate.

More interest has been awakened by the experiments with nicotine sulphate for codlin moth control than by any other experimental work yet done in the Yakima Valley. This work was begun by Mr. F. E. DeSelle, then district horticulturist, in 1915, and was continued on a much larger scale in 1916 by Mr. DeSelle and Mr. J. C. Folger. In 1915 the work was carried on in a badly infested orchard and the results were better with nicotine than with arsenate of lead. Only four trees were sprayed with nicotine, however, and the solution used, 1 to 400 for three of the sprays, was very strong. In 1916 the schedule was much more elaborate, the results being given in our Annual Report for 1916. In 1916 the principal argument in favor of nicotine in preference to the lead was that it not only controlled the codlin moth as effectively as any spray used, but also controlled the woolly aphids, which were very numerous in the orchard. This virtually classified it as a dual purpose spray. It was felt that if nicotine sulphate could be used as a dual purpose spray its value to the growers would be greatly increased, as it might be possible to save considerable expense when spraying for aphids and codlin moth together by omitting the lead arsenate which is customarily combined with the nicotine.

In the Congdon experimental plot the nicotine, as noted, was as effective against codlin moth as the lead, but it was no more effective, and in addition it is more expensive. However, the weakest solution of nicotine used in the Congdon orchard experiments was 1 to 1,024, so that we felt that if nicotine could be used at weaker strengths, 1 to 1,600, for example, or 1 to 2,132, the expense differential would be largely eliminated. For this reason our tests for 1917 were planned to compare varying strengths of nicotine sulphate, ranging from 1 to 800 to 1 to 2,132.

Unfortunately, the results at Buena do not corroborate last year's conclusions. Out of eight plots sprayed with nicotine sulphate solutions, only one, Plot S, produced as much clean fruit as Plot B, which was sprayed with ar-

senate of lead paste, two pounds to 50 gallons of water. All of the other nicotine plots, including Plot M, which was sprayed with a 1 to 800 solution, produced less clean fruit. To make the contrast even more marked, all but one of the nicotine plots received one more spray than Plot B, which should have given the nicotine some advantage even though it might have been only a slight one. The weakest solution, 1 to 2,132, used on Plot P, was the least satisfactory, only 18.4 per cent clean fruit being produced. The best results, as noted, were on Plot S, where a 1 to 1,024 solution was used with lime paste. The only conclusion that we can reach under the circumstances is that the nicotine under lower valley conditions is not as effective against codlin moth as arsenate of lead.

If the effect of the nicotine on the moth or larva is a paralysis of the nerve centers, caused by the volatile fumes, as suggested last year, it may be that its effectiveness is dissipated shortly after the application. To carry our hypothesis farther, if this is the case, it might prove effective for a few days against the worms but be valueless against a continued attack such as we invariably encounter in the lower valley.

We do not present these results as a conclusive argument against nicotine. The evidence to date is conflicting and the work should be carried on for another year at least. However, we must state frankly that our only conclusions are not very favorable to nicotine sulphate as a codlin moth control where infestation is heavy.

A report has just come to us that experiments recently carried on in Oregon by Prof. A. L. Lovett of the Oregon Agricultural College indicate that nicotine sulphate has a very definite value as an ovicide. Our information is that in the experiment the check, or untreated eggs, showed 20 per cent mortality, the eggs sprayed with nicotine sulphate 1 to 1,200, 84 per cent mortality, and the eggs treated with the same strength of nicotine sulphate, plus fish oil soap, 100 per cent mortality. These results, which have been verified, add to our explanation another very logical interpretation of the success of nicotine in lightly infested orchards and its non-success in a badly infested orchard where oviposition extended over a long period of time, a small percentage of the eggs only being present on the dates when the nicotine sprays were applied.

Calcium Arsenate.

Calcium arsenate is an arsenical spray which contains greater killing power than arsenate of lead. It has been looked upon with some suspicion because of its liability to scorch the fruit and foliage. A year ago it was used with excellent success and with scarcely any damage to the trees. Last year two different brands were used, the Rex brand at Buena and the Latimer brand in the McLeod orchard in Orchardvale. One pound to fifty gallons of water, as used in Plot G for five sprays, produced results superior to those on most of the other plots in so far as fruit free from infestation was concerned. The effect on the fruit and foliage, however, was unsatisfactory. Foliage burning was noted about the middle of July and by picking time a considerable proportion of the leaves had fallen and a burned area around the stems of some of the apples was noticeable. There was also a larger percentage of windfalls than on the plots sprayed with arsenate of lead or nicotine, this doubtless being due to burning of the stems. On Plot F, where calcium arsenate was used for the last two sprays only, the damage was much less than on G and H, where it was used throughout the season. On Plot H, where one-half pound of calcium arsenate to fifty gallons of water was used, the results were unsatisfactory from every standpoint, the infestation being nearly 30 per cent greater than on Plot G and the burning about the same. We believe, however, that the burning was in part due to the condition of the orchard, which was allowed to become very dry during the summer. This theory is supported by the results in the McLeod orchard, where the damage from burning was not so severe. The latter orchard was in vigorous growing condition throughout the season. We would not advise growers, at the present time, to use calcium arsenate in lieu of lead arsenate, excepting in an experimental way.

Distillate Oil Emulsion as a Control for Red Spider.

One other test was made in the Ross orchard which was not planned at the beginning of the season. During the summer many of the trees, particularly on the plots sprayed with nicotine, became very badly infested with red spider. A large percentage of the leaves dropped prematurely and the condition was serious. Finally distillate oil emulsion, at the rate of one and one-half gallons to 100 gallons of water, was applied and on the trees sprayed the spider was annihilated with a single spray. In many cases the trees put out new leaves. On the unsprayed trees the red spider remained for the balance of the summer. There was no burning caused by the distillate oil emulsion nor any other injury noticeable. This is of particular interest, as nicotine sulphate has been recommended by some authorities as a control for red spider. We have been convinced by work done in former years that it is ineffective in the Yakima Valley, and our experience this year appears to clinch the argument, as the trees sprayed six times with nicotine proved to be the worst infested trees. It is only fair to note that the Kentucky Tobacco Product Company, the manufacturers of the best known brand of nicotine sulphate, have never to our knowledge recommended their product for red spider control.

Powdery Mildew Experiments.

The tract selected in the McKee orchard on Selah Heights was subdivided into six plots, five of them spray plots and one an unsprayed check plot. As the greatest damage in this orchard in 1916 occurred on the fruit, counts were made at picking time and notations made of the percentage of clean fruit and of fruit showing mildew netting. Notations were also made during the growing season as to the condition of the foliage and twigs, particularly at the terminals. That the mildew was not controlled by climatic conditions is evident from the results on Plot A, the check plot, which produced only 5 per cent clean fruit and showed considerable mildew on all the terminals. The best results were obtained with three applications of iron sulphide on Plot E, but Plot C, which received three applications of atomic sulphur, was not very far behind. Where only two applications of iron sulphide or atomic sulphur were used, the results were much inferior. On Plot F, where atomic sulphur was used in combination with lime sulphur, some of the results were very good, all in all a little better than the same number of sprays with atomic sulphur or iron sulphide alone. It might be noted that the reason for using this combination was that in cool weather atomic sulphur sometimes proves ineffective, as it does not volatilize readily in cool weather. It was thought that the addition of a three-quarters degree solution of lime sulphur might cause more rapid volatilization. The results indicate that there may have been some slight advantage, though the difference is more marked on the fruit than on the foliage and twigs.

The conclusions that we would draw from our work on mildew are that the expense of a third spraying is justified by the results, at any rate in an orchard where the infection is pronounced. Moreover, the iron sulphide appears to be slightly more effective than the atomic sulphur and is also cheaper. We would also point out again that the climatic conditions in 1917 were much less favorable to mildew than in 1916 and there was less damage, as a rule, even in unsprayed orchards. In a normal or abnormally moist season, repeated sprayings would count even more.

During the coming season a product new to this valley, known as milled sulphur, will be on the market. This material is reported to have given good results in California and is recommended by Ballard and Volck, who carried on extensive experiments in mildew control in the Pajaro Valley. This will give us three materials which can be used with prospects of good success in the control of mildew.

Potato Experimental Work.

During the season of 1916, and to a lesser extent in 1915, also, considerable trouble was experienced by the growers with various potato diseases. Because of the interest aroused and urged by a number of growers, the horticultural de-

partment obtained permission from the Board of County Commissioners to establish two experimental plots, one at Sunnyside and the other near Toppenish, Washington, on the Yakima Indian reservation. Old alfalfa ground was procured for both plots. In anticipation of this work several potato fields were visited at harvest time in the fall of 1916 and some 750 pounds of tubers were carefully selected from these fields to be used for seed. Potatoes were also purchased and shipped in from other states and from other parts of this state, some being from irrigated and others from non-irrigated sections.

The purpose of the experiments were as follows:

1. To discover how best to reduce the amount of fusarium wilt and rhizoctonia, thereby increasing the yield and storage qualities.
2. To find if it is necessary to plant imported seed in order to produce maximum crops and, if so, which is preferable, irrigated or non-irrigated seed.
3. Whether it is possible to grow high quality seed on non-irrigated land in the Yakima Valley.
4. Whether it is possible to grow first quality seed under irrigation by late planting.

The results of these experiments, while not as satisfactory as was hoped for, are, at any rate, a step in the right direction.

To answer the first question, eleven different lots of potatoes infected with rhizoctonia were treated with corrosive sublimate solutions of different strengths for varying lengths of time. Before planting, the stem end was cut from the tubers and where a trace of fusarium was found further cuts were made until the potato appeared clean, the knife being disinfected before the last cut. In spite of this precaution a large percentage of the crop showed fusarium. In the results it was notable that at a ratio of one-fourth of a pound of corrosive sublimate to thirty gallons of water, seed treated from one to one and one-half hours produced results fully as satisfactory as those obtained when the seed was treated two hours or with a stronger solution.

On account of water getting into the plot at Toppenish and flooding the ground which was conducive to common scab on all plantings except the July planting, results there were not as satisfactory as they might have been. Canada Burbanks infected with powdery scab, which had been planted in the plot showed common scab, but no trace of powdery scab. One of these lots, treated with formaldehyde, one pint to thirty gallons of water, showed no signs of scab. Another lot treated with corrosive sublimate one-fourth of a pound to thirty gallons of water was also free from scab.

To answer the second, third, and fourth questions, seed was obtained from several sources. Seed was obtained from one farmer near Sunnyside from potatoes planted June 28, 1916, other seed from the same locality from a farmer who planted July 1, 1916. These two lots were planted in the experimental plots next to seed which had been shipped direct from Minnesota and the home-grown seed produced equally good yields with a smaller percentage of fusarium wilt and rhizoctonia. Seed was also obtained grown without irrigation from early plantings in the Rattlesnake Hills, north of Sunnyside, and this was planted beside imported Minnesota seed. The yield was quite similar, but there was fully as much infection in the home-grown seed as in the imported seed. However, non-irrigated seed from Oregon produced much more satisfactory yields than from irrigated districts.

Seed from Minnesota and other non-irrigated sections and late planted seed from the Yakima Valley showed equal vigor, rows of these showing across the fields before other potatoes were up.

It was also noted that seed planted fifteen inches apart in the row yielded more than that planted thirteen inches or eleven inches, and that planted thirteen inches apart more than that planted eleven inches.

A part of the Sunnyside plot was planted July 7th and a part of the Toppenish plot July 11th and 12th. Before frost killed the vines, all hills in each plot of late planting that appeared to be free from disease were marked by stakes and dug separately and the smooth potatoes true to type were selected and stored for seed. This seed should prove much superior for experimental

work in 1918 than any we were able to obtain this year. However, so many potatoes of the July planting failed to come up that it is a question whether a good stand can be obtained by planting so late. It is probable, however, that the excessive heat at that time, 100 degrees in the shade, was responsible for this by causing too rapid evaporation and consequent drying of the surface of the ground.

A great deal of the credit for the results obtained should go to Mr. F. E. DeSelle, formerly inspector in this district, as the work was planned by him and it was through his energy and determination that funds were obtained for carrying on the work.

Codlin Moth Banding Record.

There has been a great deal of discussion pro and con as to the advisability of banding apple trees to facilitate the trapping and destruction of descending codlin moth larvae. Some authorities believe that such a practice will pay, others believe that not enough larvae can be destroyed to compensate the grower for his labor. This depends largely on the locality and the age of the orchard. In the upper valleys it would be of doubtful value, but we believe that in the lower valley, particularly in the older orchards, it will do a great deal of good. A year ago band records were kept by Mr. Folger in an old orchard adjoining the Congdon orchards, and last year the work was continued in Mr. McLeod's orchard. Mr. McLeod has himself kept records in previous years and is very enthusiastic about banding.

Two hundred and thirty trees, representing several varieties, were banded with burlap sacking, the bands being put on early in July to make sure of the early members of the first brood. These trees adjoined the experimental plot, and were sprayed by Mr. McLeod throughout the season. All bands were removed every two weeks, the larvae and pupae counted and destroyed and the bands replaced. Records of each tree were kept, which are reproduced here, as they are of more than passing interest, particularly as regards the comparative immunity or susceptibility of the individuals of the various varieties. A summary of some of the more essential features of these tables is appended also:

SUMMARY.

Number of trees banded.....	230
Total number larvae and pupae destroyed.....	7,147
Average number larvae per tree.....	31
Average number pupae per tree.....	4.9
Largest number of larvae on any single tree.....	289
Largest number pupae on any single tree.....	50
Largest number larvae and pupae on single tree.....	339
Date when largest number of larvae and pupae were found.....	August 10, 1917

Dust Sprays.

Dust sprays have created a great deal of interest throughout the country for a number of years. The first dusters could scarcely be termed a success, but recently improved machines have been placed on the market for which very strong claims are made, particularly by Eastern growers. There is little doubt, from the evidence at hand, that dust sprays can be applied more quickly and more cheaply than liquid sprays. The real test then is of their relative efficiency. The Niagara Sprayer Company is now manufacturing a dust machine which has received many favorable recommendations. At the request of their representative, Mr. F. A. Frazier, arrangements were made to try out one of these machines, which was turned over to us gratis with a supply of material. The testing ground chosen included several lots on Miles avenue, near the corner of the Summitview boulevard, the property of Mrs. A. C. Caldwell. There was only one objection to this site, which was the proximity of dwelling houses. If one would live at peace with one's neighbors one should not attempt to use dust sprays, particularly near their clothes lines on Mondays. In all other respects the site was satisfactory, as there was an abundance of scale and codlin moth. When counts were made in the fall we found about 15 per cent of the fruit infested with scale. Better results were obtained with lime-sulphur on

adjoining rows which had practically the same initial infestation. In codlin moth control the best record was made on Plot A, which was sprayed four times. It produced 79.97 per cent clean fruit. We believe that a much more conclusive test could be given in a larger orchard, outside the city limits, where operations would not be cramped. While we are not prepared to recommend dusting in preference to spraying, we recognize that there are some good points about the dusting method which might be brought out more clearly by more detailed work.

(Signed) H. E. WATERBURY,
District Inspector.

CROP ESTIMATES.

For several years the division has gathered data from the different inspectors in the field, from growers, dealers, shippers, and organizations for the purpose of ascertaining the true condition of the crops and the probable yield. This information has been tabulated and reports sent out from time to time giving the results. The reports have been confined almost exclusively to the horticultural crops, but there is a growing demand for them to cover a broader field, including at least the staple crops such as potatoes, hay, corn, and small grains.

This information is demanded by shippers, dealers, fruit product factories, transportation companies, and the different government divisions; hence, it should be so gathered as to be as accurate as possible.

The information is freely given to the press and is always available at the offices of all district inspectors in their several districts, where the courtesies of their offices are always gladly extended to the public.

ORCHARD TREE CENSUS.

In order to get definite up-to-date information as to the scope of the horticultural interests of the state, it seemed advisable to take a tree census in the form of a careful survey of the horticultural resources of the state and collect statistics and general information that may be classified and show the extent of the industry. This work was begun in the fall of 1917 by the district inspectors of the different districts. We did not expect to include every tree in the state, but aimed to get a reasonably accurate count on every commercial orchard and a fair representation of the home orchards. In the principal commercial fruit counties the work is completed. In other outlying counties, where county commissioners have not furnished funds for a county horticultural inspector, the data is yet incomplete, but will be gathered from time to time and as rapidly as possible. Fully 95 per cent of the orchard trees in the state are included in these tables. The compilation is so arranged that it shows the varieties planted in earlier years. These may be compared with the later plantings which will show the tendency toward the best varieties for the different sections. In the early plantings about every variety listed was planted, but during the epoch of commercial tree planting beginning about 1900, planters specialized in varieties and planted large numbers of popular commercial varieties. The list varies somewhat in the different parts of the state, the greatest difference being in the varieties planted east and west of the Cascade range. This is necessary because of the variation in climatic conditions. Over the state Winesaps seem to predominate in numbers. Jonathans ranking second, with Rome Beauty and Delicious running close for third place. In some districts the Wagener is very popular, while Yellow Newtowns, Stay-

man, and Winter Banana are prominent. Esopus Spitzenberg is waning in popularity among growers because of its susceptibility to the ravages of insects and disease. There are several other varieties to be found in the planting in large numbers, some of which were planted as fillers, but are now being left as the permanent trees.

In the orchards west of the range the Baldwin, Northern Spy, King, and Gravenstein are very popular. Winter Banana is quite largely planted in some localities, but generally there is a very promiscuous, conglomerate list of varieties to be found in the older orchards, many of which it is impossible to identify and name. For this reason it is impossible to list the varieties as in the newer orchard sections of the state.

Pears are generally distributed over the entire state, Bartlett's, Anjou, and Winter Nellis being the popular commercial varieties. Bosc is increasing in popularity, especially on the west side, where it is very successfully grown.

Peaches are confined mostly to the territory east of the Cascades, though a few can be found on the coast regions.

Prunes, plums, and cherries are grown generally over the entire state, although there are restrictions as to successful commercial localities.

The strawberry is very cosmopolitan and can be successfully grown in any part of the state, but the bush fruits predominate in the coast territory.

In the interior irrigated valleys the American butternuts, American and European chestnuts, filberts and hickory nuts, and English and Japanese walnuts are grown with varied degrees of success. In all of the coast counties these nuts are successfully grown. Commercial plantings are to be found in some counties.

ORCHARD CENSUS.

District 1—Walla Walla County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS	
	1 Year	3 Years	5 Years	9 Years	12 Years or Older		
APPLES—							
Arkansas.....	50	284	6	1,473	463	2,226	
Delicious.....	142	6,621	6,230	1,144	97	14,234	
Jonathan.....	220	8,198	7,008	24,191	1,461	41,078	
Newtown.....	110	2,495	3,878	2,782	1,366	11,631	
Rome Beauty.....	703	6,994	8,308	27,144	2,615	46,264	
Spitz (Esopus).....		11	621	234	26	892	
Stayman.....	3	5,129	301	356	302	6,091	
Wagener.....	40		40	48	116	244	
Winesap.....	67	9,696	2,570	14,519	905	27,727	
Winter Banana.....		67	417	181	61	726	
White Winter Pearmain.....	72	100	80	553	267	1,072	
Grimes Golden.....	5	88	1,213	557	421	2,234	
Ben Davis.....	12		150	170	1,598	1,930	
Miscellaneous varieties.....	219	307	709	1,962	23,560	26,757	183,106
Crab Apples.....	15	1				16	16
PEARS—							
Miscellaneous varieties.....	8	542	536	538	658	2,632	2,632
PEACHES—							
Elberta.....	56	795	70	577	1,648	3,146	3,146
Crawford.....		112	20	309	555	996	996
Miscellaneous varieties.....	117	412	73	640	253	1,495	1,495
PLUMS AND PRUNES—							
Italian Prunes.....	17,978	4,962	448	3,425	23,703	50,516	50,516
Miscellaneous varieties.....	25	26		580	982	1,513	1,513
APRICOTS—							
Miscellaneous varieties.....	6	10	3	15	28	62	62
CHERRIES—							
Bing.....	48	604		658	980	2,290	2,290
Lambert.....	12	218	7	268	206	711	711
Royal Ann.....	230	44		360	1,054	1,748	
Miscellaneous varieties.....	28	60	15	478	510	1,091	5,839
GRAND TOTAL.....							252,822
OTHER FRUIT—							
Acres Grapes.....		87.5	4	1		92.5	
Acres Bush Fruit.....	24					24	
Acres Strawberries.....	9					9	
Total acres.....							125.5

ORCHARD CENSUS.—Continued.

District 1—Asotin County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES—						
Arkansas.....				15	50	65
Delicious.....	35			98	25	146
Jonathan.....	6	29	3,500	555	123	4,218
Newtown.....	6	100	5,250	265	48	5,669
Rome Beauty.....	20	332	5,250	563	471	6,636
Spitz (Esopus).....			3,500	33	79	3,612
Stayman.....	10		14,000	135	100	14,245
Wagener.....				26	11	37
Winesap.....		123	1,500	59	47	1,729
Winter Banana.....	10	313		13	7	343
White Winter Pearmain.....				10	2	12
Ben Davis.....					4	4
Miscellaneous varieties.....		6		98	296	400
						37,116
PEARS—						
Miscellaneous varieties.....	44	16		76	263	399
						399
PEACHES—						
Elberta.....				525	3,006	3,531
Crawford.....				193	1,473	1,666
Miscellaneous varieties.....				302	1,991	2,293
						7,490
PLUMS AND PRUNES—						
Italian.....				11	601	612
Miscellaneous varieties.....				54	1,973	2,027
						2,639
Nut Trees.....	118					118
						118
APRICOTS—						
Miscellaneous varieties.....		2		19	398	419
						419
CHERRIES—						
Bing.....				16	4,415	4,531
Lambert.....				22	837	859
Royal Ann.....				20	1,314	1,334
Miscellaneous varieties.....		18		1	487	488
						7,212
OTHER FRUIT—						
Crabapples.....	4					4
Quince.....	3					3
						7
GRAND TOTAL.....						54,428
Strawberries.....	1 A.					1 A.
Bush Fruit.....						4.5 A.
Grapes.....						1 A.
GRAND TOTAL.....						54,428

ORCHARD CENSUS.—Continued.
District 1—Columbia County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS	
	1 Year	3 Years	5 Years	9 Years	12 Years or Older		
APPLES—							
Arkansas.....				956		956	
Delicious.....							
Jonathan.....		150	6,412	4,046		10,608	
Newtown.....		15	5,785	8,628		14,878	
Rome Beauty.....		650	7,600	12,950	100	21,300	
Spitz (Esopus).....				600		600	
Stayman.....							
Wagener.....							
Winesap.....				200		200	
Winter Banana.....		100	10	135		245	
White Winter Pearmain.....							
Grimes Golden.....				135		135	
Ben Davis.....				170		170	
Miscellaneous varieties.....			14	6,600	775	7,389	55,961
PEARS—							
Miscellaneous varieties.....					75	75	75
PEACHES—							
Elberta.....		345	150	35		530	
Crawford.....							
Miscellaneous varieties.....			50			50	580
PLUMS AND PRUNES—							
Italian.....	500					500	
Miscellaneous varieties.....	1,000					1,000	1,500
APRICOTS—							
Miscellaneous varieties.....							
CHERRIES—							
Bing.....							
Miscellaneous varieties.....			10			10	10
GRAND TOTAL.....							58,146

ORCHARD CENSUS.—Continued.

District 1—Garfield County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS.	
	1 Year	3 Years	5 Years	9 Years	12 Years or Older		
APPLES—							
Arkansas.....	13	5		3	515	536	
Delicious.....	14	15		1	5	35	
Jonathan.....	4	10		1	200	215	
Newtown.....	8			15	122	145	
Rome Beauty.....	12	510		5	72	599	
Spitz (Esopus).....	12	20			332	364	
Stayman.....					161	161	
Wagener.....	17	20			248	285	
Winesap.....	3	10			84	97	
Winter Banana.....	10	10		1	69	90	
White Winter Pearmain.....					14	14	
Miscellaneous varieties.....	40	300			69	409	2,950
PEARS—							
Miscellaneous varieties.....	6,521	3,240		1,734	2,215	13,710	13,710
PEACHES—							
Elberta.....	440	1,805		6,320	7,913	16,478	
Crawford.....	225	1,200		5,670	7,463	14,558	
Miscellaneous varieties.....	2,210	1,141		3,843	5,820	13,014	57,700
PLUMS AND PRUNES—							
Italian.....	605	2,630			4,785	8,020	
Miscellaneous varieties.....	750	14,892		1,000	4,388	21,030	29,050
Nut Trees.....	24	37		58	60	179	179
APRICOTS—							
Miscellaneous varieties.....	1,092	1,380		672	1,907	5,051	5,051
CHERRIES—							
Bing.....	160	247		285	1,459	2,151	
Lambert.....		100		160	258	518	
Royal Ann.....		129		25	1,284	1,438	
Miscellaneous varieties.....		6		60	503	569	4,676
OTHER FRUIT—							
Orabapples.....	1	1,500			4	1,505	1,505
Quinces.....	24	18			24	66	66
GRAND TOTAL.....							114,947
Bush Fruit.....		14				14	
Strawberries.....	3 A.					3 A.	
Grapes.....						29.20 A.	

ORCHARD CENSUS.—Continued.

District 2—Spokane County.

VARIETIES	NUMBER AND AGE OF TREES				TOTALS	
	1 to 3 Years	5 to 8 Years	9 to 11 Years	12 Years or Older		
APPLES—						
Arkansas.....		1,013	133		1,146	
Delicious.....	1,708	13,402	5,800	122	21,088	
Jonathan.....	2,069	181,125	63,885	2,767	250,001	
Newtown.....		3,231	3,019	566	6,806	
Rome Beauty.....	4,206	128,730	59,507	3,393	196,836	
Spitz (Esopus).....	203	5,457	3,792	30	9,482	
Stayman.....	200	3,267	1,349	50	4,866	
Wagener.....	1,670	110,014	54,904	3,290	170,878	
Winesap.....	624	12,292	6,536	239	19,741	
Winter Banana.....	3,919	10,511	2,439	62	16,811	
Miscellaneous varieties.....	586	78,078	18,964	3,016	100,429	877,084
PEARS—						
Anjou.....	70	15	394	15	494	
Bartlett.....	2,436	7,507	1,223	667	11,833	12,327
PEACHES—						
Crawford.....		278	1,150	57	1,485	
Eiberta.....	40	521	872	150	1,673	3,158
PLUMS AND PRUNES—						
Miscellaneous varieties.....	1,029	516	743	16	2,304	2,304
APRICOTS—						
Miscellaneous varieties.....		11	44		55	55
CHERRIES—						
Bing.....	34	569	2,333	15	2,961	
Royal Ann.....	28	253	254	363	903	
Miscellaneous varieties.....		140	869		1,009	4,863
GRAND TOTAL.....						899,791

These figures do not include "Arcadia."

ORCHARD CENSUS.—Continued.

District 3—Benton County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES—						
Arkansas.....			2,016	4,492	164	6,672
Delicious.....	750	280	21,646	5,940	3,278	31,894
Jonathan.....		150	24,596	62,600	15,888	103,184
Newtown.....			1,116	12,218	31,030	44,364
Rome Beauty.....		550	18,322	31,272	18,268	68,412
Spitz (Esopus).....			7,660	11,860	11,096	30,606
Stayman.....			1,070	3,048	2,104	6,222
Wagener.....				10	75	1,009
Winesap.....		1,140	54,222	108,544	44,926	208,832
Winter Banana.....			2,516	2,002	3,830	8,348
Grimes Golden.....			150	284	1,036	1,470
Gravenstine.....			35	125	155	315
Yellow Transparent.....		230	678	438	964	2,360
Other varieties.....	300	220	744	3,960	5,344	10,558
PEARS—						
Anjou.....		80	490	7,584	8,671	16,815
Bartlett.....		288	5,698	14,866	12,807	33,129
Comice.....			585	4,584	1,586	7,755
Winter Nells.....		440	34	7,210	2,805	10,489
Other varieties.....		10	362	1,420	309	2,101
PEACHES—						
Elberta.....			1,010	27,214	9,270	37,494
Crawford.....			378	1,238	1,182	2,798
Schlappy.....			110	2,240	930	3,280
Hale Early.....			25	125	75	225
Other varieties.....			384	1,288	1,930	3,602
PLUMS AND PRUNES—						
Italian.....	210	320	285	2,002	1,665	4,512
Tragedy.....	350	400	1,560	3,476	30	5,816
Hungarian.....			420	478	31	929
Other varieties.....	25		210	222	66	523
APRICOTS—						
Tilton.....	25		24	86	182	317
Other varieties.....	30	42	64	259	538	933
CHERRIES—						
Bing.....	3,644	182	468	636	3,512	8,392
Royal Ann.....	144	22	186	244	2,106	2,702
Lambert.....	20	20	174	298	802	1,314
Other varieties.....	285	30	185	190	290	880
GRAND TOTAL.....						
OTHER FRUIT—						
Grapes, all ages, 94,700 vines.....						176A
Nuts.....						25A
English Walnuts.....			225	450		675A

ORCHARD CENSUS.—Continued.

District 3—Franklin County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS	
	1 Year	3 to 5 Years	5 to 8 Years	9 to 10 Years	12 Years or Older		
APPLES—							
Arkansas.....		10	20	300		330	
Delicious.....		192	924	490		1,596	
Jonathan.....		2,223	589			2,812	
Newtown.....		2,760	1,885			4,645	
Rome Beauty.....		2,052	445	610		3,107	
Spitz (Esopus).....		2,792	1,135	710		4,637	
Stayman.....		10	65			75	
Wagner.....			51			51	
Winesap.....		4,682	2,365	1,410		8,397	
Winter Banana.....		10	15			25	
Grimes Golden.....		10	6			16	
Gravenstine.....			402			402	
Yellow Transparent.....			502	160		662	
Miscellaneous varieties.....		20	126		125	261	27,086
PEARS—							
Anjou.....		680	60	250		990	
Bartlett.....		2,672	260	255	15	3,202	
Comice.....		3402				402	
Winter Nells.....		54				54	4,648
PEACHES—							
Elberta.....		904	1,785	670		3,309	
Crawford.....		634	1,112	420		2,166	
Hale Early.....		200				200	
Miscellaneous varieties.....		443				443	6,118
PLUMS AND PRUNES—							
Italian.....		10	35	100		145	
Hungarian.....		2	10	5		17	
Tragedy.....							
Miscellaneous varieties.....		18	5	5		28	190
APRICOTS—							
Royal.....		6	30			36	
Miscellaneous varieties.....		12	30			42	78
CHERRIES—							
Bing.....		12	579	160		741	
Royal Ann.....		5	329	55		389	
Lambert.....		5	60	20		85	
Miscellaneous varieties.....		16	42	45		103	1,318
OTHER FRUIT—							
Concord Grapes.....	600			1,575		2,175	
Campbell Early Grapes.....	600			1,525		2,125	
Miscellaneous varieties.....	125			490		505	4,805
English Walnuts.....			100			100	100
GRAND TOTAL.....							44,343

ORCHARD CENSUS.—Continued.

District 3—Adams County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS	
	1 Year	3 Years	5 Years	9 Years	12 Years or Older		
APPLES—							
Arkansas.....							
Delicious.....				225		225	
Jonathan.....							
Newtown.....				150		150	
Rome Beauty.....				1,250		1,250	
Spitz (Esopus).....				230		230	
Stayman.....				725		725	
Wagener.....							
Winesap.....				4,968		4,968	
Winter Banana.....							
Miscellaneous varieties.....				477	4,350	4,827	12,405
PEARS—							
Bartlett.....				125		125	125
PEACHES—							
Elberta.....				150		150	150
GRAND TOTAL.....							12,680

ORCHARD CENSUS.—Continued.
District 4—Chelan County.

VARIETIES	NUMBER AND AGE OF TREES					Totals
	1 to 2 Years	3 to 4 Years	5 to 8 Years	9 to 11 Years	12 Years or Older	
APPLES—						
Arkansas.....	45	1,511	1,936	1,965	6,584	12,041
Delicious.....	10,081	18,592	139,632	35,651	7,696	211,652
Jonathan.....	2,300	10,113	79,708	63,129	29,425	184,675
Newtown.....		310	3,887	8,083	6,168	18,448
Rome Beauty.....	1,043	16,132	52,061	26,417	16,541	112,193
Spitz (Esopus).....	53	518	26,613	55,874	24,516	107,074
Stayman.....	20	11,151	36,552	23,173	19,443	90,339
Grimes Golden.....	210	9	1,301	2,006	1,952	5,478
Winesap.....	4,504	23,001	202,092	133,587	42,482	405,666
Winter Banana.....	1,780	2,879	7,856	7,371	2,705	22,591
White Winter Pearmain.....	752	865	7,233	8,262	3,869	20,981
Ben Davis (Gano).....		357	6,395	8,508	18,042	33,302
Crabs.....	62	175	1,632	244	529	2,642
Other varieties.....	271	1,096	9,474	16,905	30,758	58,404
Grand total.....						1,285,486
PEARS—						
Anjou.....	2,321	7,612	7,209	2,388	638	20,168
Bartlett.....	7,112	3,499	19,872	10,567	6,477	47,527
Winter Nells.....	5	137	678	496	331	1,647
Other varieties.....	525	581	3,453	5,627	3,687	13,873
Grand total.....						83,215
PEACHES—						
Miscellaneous varieties.....	237	191	6,303	10,158	9,016	25,905
Grand total.....						25,905
PLUMS AND PRUNES—						
Miscellaneous varieties.....	3,879	108	3,913	1,267	3,706	12,873
Grand total.....						12,873
APRICOTS—						
Moorpark.....	796	1,282	1,636	2,143	844	6,701
Other varieties.....	3,242	153	2,670	2,655	1,151	9,870
Grand total.....						16,577
CHERRIES—						
Bing.....	262	81	827	2,082	4,535	7,787
Lambert.....	250	38	389	940	1,074	2,691
Royal Ann.....			245	1,244	1,718	3,207
Other varieties.....	57	83	531	1,355	1,229	3,255
Grand total.....						16,940

ORCHARD CENSUS.—Continued.

District 4—Okanogan County.

VARIETIES	NUMBER AND AGE OF TREES					Totals
	1 to 2 Years	3 to 4 Years	5 to 8 Years	9 to 11 Years	12 Years or Older	
APPLES—						
Arkansas.....		75	2,057	783	64	2,979
Delicious.....	2,686	5,657	58,965	4,546	30	71,874
Jonathan.....	340	9,226	63,797	12,530	621	86,514
Newtown.....		200	10,313	2,935	848	13,796
Rome Beauty.....	40	3,456	13,139	3,082	102	19,819
Spitz (Esopus).....	304	2,141	47,142	12,772	560	62,919
Stayman.....		3,331	18,568	1,454	205	23,558
Grimes Golden.....		53	577	353		983
Winesap.....	502	8,493	127,727	21,893	178	158,793
Winter Banana.....	162	504	3,371	614	71	4,812
White Winter Pearmain.....		150	653	556	40	1,399
Black Ben (Gano).....		837	2,234	769	335	3,675
Crabs.....		37	17	35	10	99
Other varieties.....		2,887	6,480	1,296	1,112	11,765
Grand total.....						462,985
PEARS—						
Anjou.....	64	1,184	1,295	431		2,974
Bartlett.....	93	780	3,543	1,754	78	6,253
Winter Nells.....		109	450	78	6	643
Other varieties.....	16	156	2,001	239	100	2,512
Grand total.....						12,382
PEACHES—						
Miscellaneous varieties.....	10	243	5,555	3,475	88	9,366
Grand total.....						9,366
PLUMS AND PRUNES—						
Miscellaneous varieties.....	2	24	507	74	62	669
Grand total.....						669
APRIOTS—						
Moorpark.....	5	19	353	28	1	411
Other varieties.....	4	13	1,868	532	39	2,456
Grand total.....						2,867
CHERRIES—						
Bing.....	62	12	146	139	101	460
Lambert.....	56	6	22	61	100	245
Royal Ann.....		16	72	70	5	163
Other varieties.....	73	203	1,996	564	338	3,174
Grand total.....						4,042

ORCHARD CENSUS.—Continued.
District 4—Douglas and Grant Counties.

VARIETIES	DOUGLAS				GRANT			
	Number and Age of Trees			Total	Number and Age of Trees			Total
	1 to 4 Years	5 to 8 Years	9 to 12 Years		1 to 4 Years	5 to 11 Years	12 or Older	
APPLES—								
Arkansas.....	90	530	92	712		4,007		4,007
Delicious.....	7,599	23,890	28,472	64,961	210	36,395		36,605
Jonathan.....	2,097	26,645	28,547	57,289		31,403		31,403
Newtown.....	90	797	2,226	3,113		12,508		12,508
Rome Beauty.....	1,662	9,525	6,878	18,065	166	25,934		26,100
Spitz (Esopus).....	423	17,096	14,564	32,073		9,767		9,767
Stayman.....	600	11,494	7,810	19,904		25,247		25,247
Grimes Golden.....	75	289	254	618		2,430		2,430
Winesap.....	4,778	85,112	63,822	153,712	311	50,322		50,633
Winter Banana.....	1,203	4,427	3,979	9,609	126	3,150		3,276
White Winter Pearmain.....	807	1,706	1,407	3,920		5,112		5,112
Black Ben (Gano).....	83	1,334	4,509	5,926		932		932
Crabs.....	111	240	55	406				
Other varieties.....	242	5,991	3,987	10,220		11,021	450	11,471
Grand total.....				380,523				219,491
PEARS—								
Anjou.....	435	1,846	545	2,826		400	620	1,020
Bartlett.....	396	4,768	3,905	9,069	100	9,595	115	9,810
Winter Nellis.....	12	58	285	335		655		655
Other varieties.....	180	1,114	1,846	2,640		501		501
Grand total.....				14,870				11,986
PEACHES—								
Miscellaneous varieties.....	126	7,814	6,099	14,039		2,077	590	2,667
Grand total.....				14,039				2,667
PLUMS AND PRUNES—								
Miscellaneous varieties.....	368	256	249	873		3,062	20	3,102
Grand total.....				873				3,102
APRICOTS—								
Moorpark.....	358	1,635	3,188	5,181		805		805
Other varieties.....	1,251	2,915	1,294	5,460		75	6	81
Grand total.....				10,641				886
CHERRIES—								
Bing.....	29	406	595	1,030		1,043	50	1,093
Lambert.....	6	336	151	493		528	25	553
Royal Ann.....		177	296	473		98		98
Other varieties.....	78	879	679	1,632		82	9	91
Grand total.....				3,632				1,835

ORCHARD CENSUS.—Continued.

District 5—Yakima County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS	
	1 to 3 Years	3 to 6 Years	7 to 10 Years	10 to 12 Years	12 Years or Older		
APPLES—							
Arkansas.....	2,118	5,147	12,920	9,343	2,516	32,044	
Delicious.....	10,480	38,843	55,314	929	1,279	106,845	
Jonathan.....	3,792	146,816	288,446	37,166	15,597	490,817	
Newton.....	192	5,943	59,151	11,510	9,719	86,515	
Rome Beauty.....	1,538	68,094	97,399	27,336	11,150	219,332	
Spitz (Esopus).....	403	24,316	85,692	16,596	10,891	137,996	
Stayman.....	1,153	2,484	12,777	5,353	2,710	23,477	
Wagener.....	241	27,679	29,375	4,771	790	62,866	
Winesap.....	16,756	157,225	512,918	67,922	21,679	776,500	
Winter Banana.....	546	1,276	6,670	1,119	88	9,699	
Ben Davis.....		356	1,829	2,964	8,881	13,536	
Grimes Golden.....	25	894	5,329	3,978	2,811	13,037	
White Winter Pearmain.....	356	501	1,243	925	1,836	4,861	
Miscellaneous varieties.....	1,619	5,947	26,583	16,333	22,185	78,264	2,050,181
PEARS—							
Anjou.....	4,492	8,225	14,213	1,703	1,097	29,730	
Bartlett.....	9,807	70,136	221,322	34,164	15,554	350,983	
Comice.....	391	1,720	10,959	3,080	103	16,233	
Winter Nells.....	9,269	21,507	53,054	5,354	1,132	90,316	
Miscellaneous varieties.....	400	879	3,562	530	1,485	6,856	494,118
PEACHES—							
Crawford.....	70	901	9,106	1,233	751	12,061	
Elberta.....	2,042	20,693	179,558	24,603	15,396	242,292	
Miscellaneous varieties.....	2,119	8,759	30,533	7,023	1,523	49,962	304,315
PLUMS AND PRUNES—							
Italian.....	8,484	5,764	3,439	5,085	15,125	37,897	
Tragdy.....	11,828	7,090	3,920	676	460	23,944	
Miscellaneous plum and prune....	3,053	3,618	1,584	709	1,426	10,450	72,291
APRICOTS—							
Miscellaneous varieties.....	2,467	658	4,442	1,040	419	9,026	9,026
CHERRIES—							
Bing.....	911	726	9,541	2,340	980	14,498	
Lambert.....	175	75	2,336	436	190	3,212	
Royal Ann.....	73	219	4,822	1,197	968	17,279	
Miscellaneous varieties.....	748	1,654	6,200	2,792	1,719	13,113	38,102
OTHER FRUIT—							
Miscellaneous varieties.....	20	427	4,144	1,268	1,519	7,378	7,378
GRAND TOTAL.....							2,975,411

ORCHARD CENSUS.—Continued.

District 6—Clarke County.

VARIETIES	NUMBER AND AGE OF TREES			TOTALS
	1 to 6 Years	6 to 10 Years	12 Years or Older	
Apples.....	6,698	29,818	48,184	84,700
Walnuts.....	1,842	2,884	2,460	7,186
Filberts.....	211	385	1,154	1,750
Almonds.....	7		32	39
Figs.....		8	10	18
Mulberries.....	10			10
Quinces.....	6	11	33	50
Chestnuts.....			25	25
PEARS— All varieties.....	2,051	2,751	22,084	26,886
Family orchards.....	2,696	6,697	40,945	50,311
PEACHES— All varieties.....	1,037	1,613	531	3,181
Grapes.....				18,850
PLUMS AND PRUNES— Miscellaneous varieties.....	165,451	99,598	390,941	655,990
APRICOTS— Miscellaneous varieties.....		4	16	20
CHERRIES— All varieties.....	598	1,385	5,842	7,925
GRAND TOTAL.....				867,241
OTHER FRUIT— Blackberries Raspberries Loganberries Strawberries				100 A.

ORCHARD CENSUS.—Continued.
District 6—Skamania County.

VARIETIES	NUMBER AND AGE OF TREES	TOTALS
	5 to 12 Years or Older	
APPLES—		
Arkansas.....	348	
Delicious.....	2,327	
Jonathan.....	648	
Newtown.....	2,205	
Rome Beauty.....	683	
Spitz (Esopus).....	11,455	
Stayman.....	123	
Wagener.....	123	
Winesap.....	91	
Winter Banana.....	1,812	
Ortley.....	3,926	
Gravenstine.....	523	44,950
PEARS—		
Anjou.....	8,443	
Bartlett.....	1,575	
Comice.....	9	
Winter Nellis.....	499	
Miscellaneous varieties.....	1,284	11,800
PEACHES—		
Crawford.....	235	
Foster.....	401	
Elberta.....	204	
Mayflower.....	400	
Elton.....	184	
Other varieties.....	112	1,539
PLUMS AND PRUNES—		
Italian.....	136	
Other varieties.....	46	182
APRICOTS—		
Moor Park.....	5	5
CHERRIES—		
Bing.....	126	
Lambert.....	85	
Black Republican.....	18	
Other varieties.....	170	349
OTHER FRUIT—		
Walnuts.....		72
GRAND TOTAL.....		58,897

ORCHARD CENSUS.—Continued.
District 7—Lewis County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	10 Years	12 Years or Older	
APPLES—						
Miscellaneous varieties.....	1,200	3,600	7,500	10,500	12,500	35,300
PEARS—						
Miscellaneous varieties.....	1,200	2,000	2,500	3,000	2,500	11,200
PEACHES—						
Miscellaneous varieties.....	25	200	250	100	100	675
Quinces.....						400
Walnuts.....						200
PLUMS AND PRUNES—						
Miscellaneous varieties.....	1,000	2,500	500	4,500	2,500	11,000
CHERRIES—						
Miscellaneous varieties.....	2,500	15	1,200	1,125	3,000	7,830
GRAND TOTAL.....						68,805
Bush Fruit.....						50 A.
OTHER FRUIT—						
Strawberries.....	200					200

ORCHARD CENSUS.—Continued.

District 7—Grays Harbor County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES—						
Miscellaneous varieties.....	6	1,500	4,000	4,000	7,000	16,506
PEARS—						
Miscellaneous varieties.....	200	250	300	300	1,000	2,050
PEACHES—						
Miscellaneous varieties.....	50	50	55	40	10	215
PLUMS AND PRUNES—						
Miscellaneous varieties.....	75	200	225	450	2,500	3,450
Walnuts.....						100
Quinces.....						225
CHERRIES—						
Miscellaneous varieties.....	50	100	115	500	800	1,565
GRAND TOTAL.....						24,111
OTHER FRUIT—						
Strawberries.....						50 A.
Cranberries.....						150 A.
Bush Fruit.....						50 A.

ORCHARD CENSUS.—Continued.
District 7—Pacific County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES—						
Miscellaneous varieties.....	200	225	350	1,500	2,500	4,775
PEARS—						
Miscellaneous varieties.....	75	100	150	200	400	925
Quinces.....						50
Walnuts.....						25
PLUMS AND PRUNES—						
Miscellaneous varieties.....	50	75	300	300	50	500
CHERRIES—						
Miscellaneous varieties.....						550
GRAND TOTAL.....						6,915
OTHER FRUIT—						
Cranberries.....						300 A.
Strawberries.....						10 A.
Bush Fruit.....						10 A.

ORCHARD CENSUS.—Continued.

District 7—Thurston County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES—						
Miscellaneous varieties.....	1,500	2,500	4,000	10,000	20,000	38,000
PEARS—						
Miscellaneous varieties.....	500	750	1,200	3,000	1,500	6,950
PEACHES—						
Miscellaneous varieties.....	50	50	200	350	200	850
Walnuts.....						50
Quinces.....						100
PLUMS AND PRUNES—						
Miscellaneous varieties.....	50	150	225	2,000	8,500	5,925
CHERRIES—						
Miscellaneous varieties.....	400	550	1,000	1,000	500	3,450
GRAND TOTAL.....						55,335
OTHER FRUIT—						
Bush Fruit.....						20 A.
Strawberries.....						12 A.
Cranberries.....						10 A.

ORCHARD CENSUS.—Continued.
District 7—Mason County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES— Miscellaneous varieties.....	300	500	1,000	2,500	3,000	7,300
PEARS— Miscellaneous varieties.....	100	175	250	325	400	1,200
PEACHES— Miscellaneous varieties.....	50	75	100	150	50	425
PLUMS AND PRUNES— Miscellaneous varieties.....	100	150	250	250	300	1,050
Nut Trees.....						50
CHERRIES— Miscellaneous varieties.....	100	100	200	325	375	1,100
GRAND TOTAL.....						11,125
Grapes.....						50 A.
OTHER FRUIT— Quinces.....			200			200
Bush Fruit.....			20 A.			20 A.
Strawberries.....			15 A.			15 A.

ORCHARD CENSUS.—Continued.
District 8—Jefferson County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES— Miscellaneous varieties.....						12,010
PEARS— Miscellaneous varieties.....						808
PLUMS AND PRUNES— Miscellaneous varieties.....						1,118
CHERRIES— Miscellaneous varieties.....						2,004
OTHER FRUIT— Strawberries.....						7 A.
Raspberries.....						5 A.
Blackberries.....						5 A.
Loganberries.....						5 A.

ORCHARD CENSUS.—Continued.

District 8—Clallam County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES— Miscellaneous varieties.....						24,302
PEARS— Miscellaneous varieties.....						2,403
PLUMS AND PRUNES— Miscellaneous varieties.....						2,101
CHERRIES— Miscellaneous varieties.....						4,115
OTHER FRUIT— Strawberries.....						5 A.
Raspberries.....						6 A.
Loganberries.....						10 A.

ORCHARD CENSUS.—Continued.

District 8—Pierce County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES— Miscellaneous varieties.....				75,180		75,180
PEARS— Miscellaneous varieties.....				20,160		20,160
PLUMS AND PRUNES— Miscellaneous varieties.....				6,211		6,211
CHERRIES— Miscellaneous varieties.....				9,010		9,010
OTHER FRUIT— Raspberries.....						1,055 A.
Blackberries.....						542 A.
Strawberries.....						97 A.
Loganberries.....						14 A.

ORCHARD CENSUS.—Continued.

District 8—Kitsap County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES— Miscellaneous varieties.....						42,190
PEARS— Miscellaneous varieties.....						11,201
PLUMS AND PRUNES— Miscellaneous varieties.....						3,109
CHERRIES— Miscellaneous varieties.....						8,010
OTHER FRUIT— Strawberries..... Raspberries..... Blackberries..... Loganberries.....						90 A. 10 A. 5 A. 5 A.

ORCHARD CENSUS.—Concluded.

District 9—King County.

VARIETIES	NUMBER AND AGE OF TREES					TOTALS
	1 Year	3 Years	5 Years	9 Years	12 Years or Older	
APPLES— Miscellaneous varieties.....						81,750
PEARS— Miscellaneous varieties.....						24,240
PEACHES— Miscellaneous varieties.....						3,692
PLUMS AND PRUNES— Miscellaneous varieties.....						17,960
APRICOTS— Miscellaneous varieties.....						369
CHERRIES— Miscellaneous varieties.....						27,796
OTHER FRUIT— Quince..... Nuts.....						714 409
GRAND TOTAL.....						155,929

VARIETY ORCHARD CENSUS BY DISTRICTS—TOTAL NUMBER OF APPLE TREES.

APPLES	District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8	District 9	District 10	Totals
Arkansas.....	2,827	1,146	7,227	20,434	32,044	343	.....	.....	.....	.....	64,021
Delicious.....	14,666	21,088	34,015	876,123	106,845	2,327	.....	.....	.....	.....	555,064
Jonathan.....	56,119	250,001	105,996	440,639	490,317	648	.....	.....	.....	.....	1,343,720
Newtown.....	31,823	6,806	49,159	43,833	86,515	2,205	.....	.....	.....	.....	220,891
Rome Beauty.....	74,711	198,836	72,769	214,251	219,332	683	.....	.....	.....	.....	777,582
Spitz.....	5,468	9,482	35,473	249,650	137,898	11,455	.....	.....	.....	.....	449,493
Stayman.....	20,507	4,866	7,022	215,294	23,477	123	.....	.....	.....	.....	271,279
Wagner.....	566	170,878	1,090	5,787	62,856	128	.....	.....	.....	.....	241,270
Winesap.....	29,762	19,741	223,177	855,761	776,500	91	.....	.....	.....	.....	1,904,032
Winter Banana.....	1,404	16,311	8,373	15,751	9,699	1,912	.....	.....	.....	.....	31,391
Ben Davis.....	2,369	.....	.....	.....	13,536	.....	.....	.....	.....	.....	16,892
Grimes Golden.....	1,103	.....	1,496	41,121	4,861	.....	.....	.....	.....	.....	47,085
White Winter Pearmain.....	.....	.....	.....	.....	.....	523	.....	.....	.....	.....	1,240
Gravenstein.....	.....	.....	717	.....	.....	.....	.....	.....	.....	.....	7,849
Yellow Transparent.....	.....	.....	7,849	33,818	.....	.....	.....	.....	.....	.....	33,818
Gano.....	.....	.....	.....	.....	.....	3,920	.....	.....	.....	.....	3,920
Ooley.....	.....	.....	.....	.....	.....	84,700	.....	.....	.....	.....	84,700
Miscellaneous varieties.....	17,246	100,429	15,646	115,000	73,264	.....	101,881	86,020	81,750	.....	574,115
Totals.....	280,675	791,064	563,998	2,664,047	2,050,151	109,059	101,881	86,020	81,750	.....	6,617,785

VARIETY ORCHARD CENSUS OF TREES BY DISTRICTS.

	District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8	District 9	District 10	Totals
PEARS—											
Anjou.....		494	17,905	25,337	29,730	8,433					81,709
Bartlett.....		11,833	83,331	82,037	350,983	1,575					482,779
Comice.....			8,157	4,771	16,233	9					29,170
Winter Nellis.....			10,533	5,220	90,316	499					106,568
Miscellaneous varieties.....	16,836			11,549	6,856	28,160	22,335	34,567	24,240		122,198
Total.....											822,514
PEACHES—											
Elberta.....	23,635	1,073	40,954		242,252	204					308,898
Crawford.....	17,320	1,485	2,954		12,061	235					33,965
Miscellaneous varieties.....	16,352		7,750	113,170	49,963	1,097	2,165		3,692		192,523
Total.....											536,286
PLUMS AND PRUNES—											
Italian.....	89,658		4,637		37,897						102,122
Tragedy.....			5,516		23,944						29,760
Miscellaneous varieties.....	25,570	2,304	1,497	11,103	10,450	666,136	22,015	12,534	17,980		747,603
Total.....											879,485
APRICOTS—											
Moor Park.....				32,725							32,725
Miscellaneous varieties.....	5,532	55	1,523	8,051	9,026	25					24,886
Total.....											37,111
CHERRIES—											
Bing.....	8,872	2,951	9,133		14,498	123					35,590
Lambert.....	2,088		1,399		3,212	86					6,794
Royal Ann.....	4,520	903	3,231	7,279	7,279	18					16,011
Miscellaneous varieties.....	2,172	1,009	983	25,003	18,113	8,274	14,495	23,139	27,795		104,518
Total.....											162,893
ORABAPPLES—											
Quinces.....	1,525			3,337							6,642
Bush Fruits.....	69			300	340	50			714		1,473
Strawberries.....	41,50 A.					100 A.		1,656 A.			
Nut Trees.....	12,25 A.					275 A.		196 A.			
Grapes.....	532		23,475			425		149	409		
English walnuts.....	123.7 A.		176 A.			18,350	5,000				
Miscellaneous Fruit.....			25 A.			7,133					
Elberta.....				425	7,378						
Almonds.....						1,750					
Chestnuts.....						89					
Figs.....						25					
Family orchard.....						18					
Oranberries.....						50,611	900 A.				
Total trees.....	185,121										

**APPROXIMATE FIGURES FOR FOURTEEN COUNTIES—FRUIT TREE DATA
FROM 1912 RECORDS, NOT INCLUDED IN PREVIOUS TABLES.**

COUNTIES	Apple	Pear	Peach	Cherry	Plum, Prune	Apricot
Cowlitz.....	21,000	3,200	.....	2,500	6,550	.....
Ferry.....	23,000	7,500	.....	1,800	1,000	.....
Iland.....	54,000	.....	.....	.....	.....	.....
Kittitas.....	16,000	.....	.....	.....	.....	.....
Lincoln.....	86,000	174,200	34,000	.....	6,000	.....
Pend Oreille.....	126,000	850	300	900	5,400	.....
San Juan.....	50,000	70,000	.....	3,500	6,800	.....
Skagit.....	60,000	18,500	.....	8,100	6,500	.....
Snohomish.....	81,000	20,500	.....	9,000	5,500	.....
Stevens.....	33,000	23,000	12,000	7,300	13,200	.....
Wahkiakum.....	6,550	4,950	3,900	1,250	5,500	.....
Whatcom.....	40,000	7,900	.....	8,300	5,600	.....
Whitman.....	186,000	9,200	83,000	14,300	6,850	6,500

POLICE WORK.

The regulatory or police work has to do with the inspection of all warehouses, storerooms, orchards, markets, fruits, or vegetables, and if infection is found inspectors are empowered with authority to disinfect or if necessary to condemn and destroy any property which is or may become a menace to the horticultural interests of the state, or if any fruit found upon the market is misbranded as to grade or pack they see that the markings are changed to correspond with the grade of the fruit.

During the shipping season frequent visits are made by the inspectors to the packing houses, warehouses, and shipping points to ascertain if the grade and the pack conforms with the provisions of the law. If it does not, fruit is either repacked or else the grade markings are changed before the fruit can be shipped. The law provides for the giving of permits for fruit to be used for by-products. This privilege is sometimes abused by shippers purchasing cull fruit securing a permit to ship to certain by-product plants, and after the car is rolled, order it diverted to other points, sometimes to other states, where the fruit is sold in the open markets. When such cases are found within the state the inspector can seize and handle the fruit as conditions warrant. The law explicitly forbids the placing of wormy apples upon the open markets in the state and each year there are more or less arrests and convictions of peddlers and hucksters who try to evade this phase of the law.

CLEAN-UP WORK.

In all fruit sections there is more or less non-resident orchard property, which is a menace to adjoining orchards.

It is necessary to look over these properties carefully each year and ascertain if caretakers are giving them the proper attention, to keep them from becoming a harbor for pests.

When this condition arises it becomes necessary to do such cleanup work as is advisable. It may be pruning, spraying, or both, and in some cases general condemnation is ordered and the orchard removed so that it may not become a menace to the community.

Blight, San Jose scale, and some other of the most serious pests make more or less cleanup work necessary each year.

This work is usually done while the trees are dormant. Last season 156 notices were served, and where the owner or caretaker did not give the trees the proper attention the matter was handled by the inspection service and the cost charged against the property.

INSPECTION.

The inspection work consists in the careful examination of all orchards and nurseries within the state as far as available funds will permit, to ascertain if they are free from dangerous insects or disease. The examination of imported nursery stock, whether coming from other states or from foreign countries, the examination of commercial fruit to see if it is clean of pests and that it is graded and packed according to the grading rules of the state adopted for the current season. Potatoes and vegetables in general coming into the state from other states are inspected against tuber moth or other infestation.

WEEKLY REPORTS.

Weekly reports are made by all inspectors in which they designate the character of work performed for that period and report any matters coming under their observation which needs special attention. The following copy of the report shows the volume of the work done during the last nine months of the fiscal year, from October 1, 1917, to July 1, 1918. These reports give us a check upon the men in the field and keep us informed as to their general activities in the different parts of the state. Weather conditions such as frosts, severe wind storms, or hard freezes are reported, and any unusual prevalence of insect activity is noted.

Labor conditions at spraying or harvesting periods is reported, all of which is essential information that we must have if we keep in close touch with the general field conditions.

STATE OF WASHINGTON—DEPARTMENT OF AGRICULTURE.

DIVISION OF HORTICULTURE.

Following record is for nine months, October 1, 1917, to July 1, 1918:
The size of report blanks is 8½x14 inches.

	LOCALITY OR TOWN	INSPECTED		Demonstrations, Lectures, or Meetings	Letters Sent Out, Not Circulars	Tele- phone Calls	List of Farms Visited.
		Orchards (Acres)	Nurseries or Crops				
Monday							
Tuesday		134,607 acres of orchards inspected.					
Wednesday		2,221 orchards inspected; acreage not given.					
Thursday		2,680 acres of nurseries and nursery crops inspected.					
Friday		372 nurseries and crops inspected; acreage not given.					
Saturday							
				148	6,085	6,271	10,217

Days and half days in office..... 518
Days and half days in field..... 2,134
Number of circulars sent out..... 23,258
Miles traveled by auto..... 36,715
Miles traveled by rail..... 9,904
Miles traveled by other conveyance..... 6,634

MATTERS NEEDING SPECIAL ATTENTION

Condemnation and clean-up notices sent, 156

The reverse side of this weekly report blank (8½ by 14 inches).

INSPECTION OF FRUITS OR VEGETABLES.

Date	GROWER OR SHIPPER	SOLD OR CONSIGNED TO	NUMBER OF PAACKAGES		Inspection	Remarks, Disposition, Etc.
			Inspected	Condemned		
Nine months' summary of these reports, October, 1917, to June 30, 1918.....			808,732 57 cars	24,992 6 cars		
Packages repacked.....						2,058

NURSERY INSPECTION.

The inspection of nurseries and nursery stock is done mostly at the digging and shipping season, because this is the only time when the conditions of both stock and roots can be properly examined. This branch of the inspection is very important, as upon it depends the distributing of nothing but healthy stock. The inspection of foreign stock is given close attention in order that new pests from foreign countries may not be imported on the stock. Seattle is the principal distributing point for nursery stock in the Northwest. Mr. F. N. Rhodes has in charge both the federal and state inspection work at that point.

The law requires that all nurseries operating in the state shall have a state license. This is a protection to the purchaser of nursery stock because if he secures his stock from a licensed nurseryman, that nursery is under bond to produce healthy stock true to the name for which it was sold.

The following list shows the nurseries licensed for the years 1916-1917 and 1917-1918. The license fee is \$5.00 a year and the bond requirement is \$1,000.00:

LIST OF NURSERYMEN AND FLORISTS LICENSED TO DO BUSINESS IN THE STATE OF WASHINGTON FOR THE YEAR 1916-1917.

Aabling-Boyce Seed Co., 89 Pike Street, Seattle.
Art Floral Co.; C. Nojl, proprietor, 94 Pike Street, Seattle.
Beall Greenhouse Co., Seattle.
Bear, C. H., 6420 Flora Avenue, Seattle.
Blossom Floral Co., Walla Walla.
Bonnell, J. J., 2601 East Galer Street, Seattle.
Boyd Nursery, Everett.
Broadway Floral Co.; L. Le Gros, proprietor, Everett.
Brown, E. E., Detroit.
Buchanan, J. A. and A. A., Quarnberg, Vancouver.
Burien Lake Nursery, 204 Second Avenue South, Seattle.
Burt, A. J., florist, 829 Riverside Avenue, Spokane.
Carver, Gleason A., 2324 North Fiftieth Street, Seattle.
Capital City Nurseries and Greenhouse, Olympia.
Capital Hill Floral Co., 1524 Fifteenth Avenue North, Seattle.
Capital Hill Floral Co., 1524 Fifteenth Avenue, Seattle.
Christopher Nurseries, Christopher.
City Floral and Seed Co., 1910 Hewett Avenue, Everett.
Columbia and Okanogan Nursery Co., Wenatchee.
Cornwall Park Nursery and Floral Co., Bellingham.
Dameyer, C., 603 Leary Building, Seattle.
Davis, W. H., Kirkland.
Driscoll, James A., 11 West Main Avenue, Spokane.
Everett Floral Co., 1814 Hewitt Avenue, Everett.
Evergreen Nursery, Third Avenue and Pine Street, Seattle.
Evergreen Nursery, Tacoma.
Ferndale Nursery, Ferndale.
Fremont Floral Co., North Fortieth and Evanston, Seattle.
Fugito, T., 407 Riverside Avenue, Spokane.
Furuya Co., M., Inc., 216 Second Avenue South, Seattle.
Gerhardt, O., Box 76, Riverton.
Heege, Otto, 1401 Trenton Avenue, Seattle.
Hinz, A. A., 618 South K Street, Tacoma.
Hoadly, C., Kennewick.
Hollywood Gardens, Inc., 1534 Second Avenue, Seattle.
Home Nursery Co., Richland.
Hopkins, J. G., Tukwila.
Hopkins, T. R., R. F. D. No. 1, Kirkland.
Horst's Floral Shop, Bellingham.
Hoyt Brothers Co., 11 Post Street, Spokane.
Hulseman, L. H., Lakeside.
Island Nurseries and Fruit Farm, Vashon.
James, J. H., 928 South Tenth Street, Pasco.
Kelley, A. A., nurseryman and gardener, Station B, Spokane.
Key City Greenhouses, Port Townsend.
Kincaid, J. W., Bellingham.
Kittle and Langlois, Ritzville.
Krause, H. E., R. F. D. No. 8, Spokane.

Lake Chelan Nursery Co., Chelan.
 Lakeview Nursery, 1601 Fifteenth Avenue North, Seattle.
 Lange, Paul E., 8513 Weedon Place, Seattle.
 Latona Floral Co., 347 East Fifty-sixth Street, Seattle.
 Lewis, J. W., Box 245, Sedro Woolley.
 McCormick, Mr. H. B., 1121 High Street, Bellingham.
 McCormack Brothers, Pacific and Fifteenth, Tacoma.
 McCoy, L. W., Second and Marion Streets, Seattle.
 Meadowdale Nursery, R. F. D. No. 1, Edmonds.
 Methow Trading Co., Winthrop.
 Moffet, Fred I., R. F. D. No. 1, Ellensburg.
 Mt. Vernon Nursery Co., Mt. Vernon.
 Nishitani, D., R. F. D. No. 1, Box 92, Seattle.
 Northern Pacific Nurseries, Toppenish.
 Ornamental and Fruit Nursery Co., Wapato.
 Overman's Nursery, 29 Monroe Street, Spokane.
 Payne, Frank E., Camas.
 Pioneer Floral Co., 3118 Yesler Way, Seattle.
 Prosser Nurseries, Prosser.
 Pudor, O. M., Puyallup.
 Puget Sound Nursery and Seed Co., Seattle.
 Puyallup Nursery, Puyallup.
 Rainier Nursery, Third and Pine Streets, Seattle.
 Reimer's Floral Art Shop, 807 Riverside Avenue, Spokane.
 Richmond Nurseries, Richmond.
 Riegel, E. and W. L., Cooper, Vancouver.
 Riverside Nursery; R. A. Jones, proprietor, Spokane.
 Rosala Brothers, 1003 Third Avenue, Seattle.
 Rosecraft Fruit Farm, Sumner.
 Sanved, Peter, nurseryman, 1803 Thirty-ninth North, Seattle.
 Sea View Park Greenhouse and Nursery, 6539 California Avenue, Seattle.
 Seattle Floral Co., Fourth Avenue and Denny Way, Seattle.
 Seattle Nursery Co.; Gerald Carver, proprietor, Seattle.
 Shomaker, Joel, Nellita.
 Simpson, Chas. S., Yakima.
 Slaughenhaupt, J. B., Kennewick.
 Slauson, H. B., 5416 Morgan Street, Seattle.
 Smith Floral Co., 1716 South Fifty-sixth Street, Tacoma.
 Snohomish Nursery; W. J. Ricketts, proprietor, Snohomish.
 Spokane Nursery; Otto Hubenthal, proprietor, Spokane.
 Stapleton, Donart, Spokane.
 Stephens, C. D., R. F. D. No. 4, Yakima.
 Stitz, A. A., Everett.
 Stuber and Richardson, 4852 Holly Street, Seattle.
 Tate, C. F., Grandview.
 Toppenish Nursery Co., Toppenish.
 Turner, Garrison, 4320 Fourteenth Avenue Northeast, Seattle.
 The Bon Marche, Second and Pike, Seattle.
 The Burdett Co., First and Denny Way, Seattle.
 The Northern Nurseries, Otis Orchards.
 University Nursery and Greenhouse, 4008 Ninth Avenue Northeast, Seattle.
 Waignt, Chas. H., 2052 North Seventy-eighth Street, Seattle.
 Washington Nursery Co., Toppenish.
 Wenatchee Home Nursery, Wenatchee.
 Westlake, T. E., care Westlake Public Market, Spokane.
 White Salmon Nursery, White Salmon.
 Whitney, F. A., 3846 Thirty-fourth Avenue West, Seattle.
 Wibra, G. I., Chehalis.
 Wingren, O. J., LaConner.
 Woolworth & Co., F. W., 1106 Pacific Avenue, Tacoma.
 Yakima & Columbia River Nurseries Co., Yakima.
 Yakima Valley Nursery Co., Toppenish.
 Young, W. D., Kennewick.
 Young & Lester, nurserymen, Walla Walla.

OUTSIDE THE STATE.

Albany Nurseries, Albany, Ore.
 Birchler, Henry, 1406 East Stark Street, Portland, Ore.
 Bobbink & Atkins, Rutherford, N. J.
 Butzer, J. J., 188 Front Street, Portland, Ore.
 Capital City Nursery, Salem, Ore.
 Clark Brothers, nurserymen, 287 Morrison Street, Portland, Ore.
 Dreer, Henry A., 714 Chestnut Street, Philadelphia, Pa.
 Eastern Nurseries, Jamaica Plain, Mass.
 Gardner Nursery Company, Osage, Iowa.
 German Nurseries and Seed House, Beatrice, Neb.
 Kellogg, R. M. Company, Three Rivers, Mich.
 Lafayette Nursery Co., Lafayette, Ore.
 Meehan, Company, Thos. B., Dresher, Pa.
 Milton Nursery Co., Milton, Ore.
 Oregon Nursery Co., Orenco, Ore.

Pacific Nursery Co., Portland, Ore.
 Pilkington, J. B., P. O. Box 242, Portland, Ore.
 Portland Seed Co., Inc., Front and Yamhill Streets, Portland, Ore.
 Portland Wholesale Nursery Co., 112½ Grand Avenue, Portland, Ore.
 Quaker Nurseries, Salem, Ore.
 Rose Valley Nursery, 1052 Corbett Street, Portland, Ore.
 Russellville Nurseries, Inc., R. F. D. No. 1, Box 265, Portland, Ore.
 Salem Nursery Co., Salem, Ore.
 Sherbrooke, W. E., Cornelius, Ore.
 Silva-Bergtholdt Co., New Castle, Cal.
 Stark Bros. Nurseries and Orchard Co., Louisiana, Mo.
 Storrs & Harrison Co., Painesville, Ohio.
 Taylor & Co., H. S., Rochester, N. Y.
 True-to-Name Nursery, Hood River, Ore.
 The Villa Nursery, R. F. D. No. 1, Box 395, Portland, Ore.
 Weed Landscape Nursery, Beaverton, Ore.
 Wheelock, Alton R. and Herbert E. Congdon, North Collins, N. Y.

LIST OF NURSERYMEN AND FLORISTS LICENSED TO DO BUSINESS IN THE STATE OF WASHINGTON FOR THE YEAR 1917-1918.

Adams County—

Kittel, J. C., Ritzville.

Asotin County—

Lewiston-Clarkston Improvement Co., Clarkston.

Benton County—

Gardner, J. R., Richland.
 Home Nursery Co.; Fred P. Freeman, proprietor, Richland.
 Prosser Nurseries, P. E. Nickerson, proprietor, Prosser.
 Slaughtenhaupt, J. B., Kennewick.

Chelan County—

Columbia & Okanogan Nursery Co., Inc., Wenatchee.
 Hulseman, L. H., Lakeside.
 Post, Fred L., Chelan.

Clarke County—

Buchanan & Quarnberg, Vancouver.
 Hansen, Andrew, Vancouver.
 Lewis, Mrs. Harriet C., Vancouver.
 Luepke, Frank, Vancouver.
 Palmer, Chester M., R. F. D. No. 3, Box 32, Vancouver.
 Payne, Frank E., Camas.
 Riegel, E. and W. I. Cooper, Vancouver.
 Ward, A. A., Brush Prairie.

King County—

Aabling-Boyce Seed Co., Inc., 89 West Pike Street, Seattle.
 Allen, F. B., 506 North Seventy-second Street, Seattle.
 Araki, N., Elmgrove Street, South Park, Seattle.
 Art Floral Co.; G. Nojl, proprietor, 94 Pike Street, Seattle.
 Bauer, Christian, 530 Twenty-eighth Avenue North, Seattle.
 Beall Greenhouse Co., Vashon.
 Bear, C. H., 6420 Flora Avenue, Seattle.
 Bell, Frank J., 5216 Myrtle Street, Seattle.
 Benson, E. G., 3600 Montlake Boulevard, Seattle.
 Bonnell, J. J., 2601 East Galer Street, Seattle.
 Burns Floral Co., 601 Third Avenue, Seattle.
 Buxton, A. E., 7332 Wilson Avenue, Seattle.
 Capital Hill Floral Co., 1524 Fifteenth Street North, Seattle.
 Carver, Gleason A., 2324 North Fiftieth Street, Seattle.
 Christopher Nurseries; John A. Stewart and Son, Christopher.
 Davis, W. H., Kirkland.
 Domeyer, C., 603 Leary Building, Seattle.
 Dupea, Thomas, 3829 Renton Avenue, Seattle.
 East Seattle Florist; S. E. Sanford, proprietor, Seattle.
 Evergreen Nursery, Third and Pine Streets, Seattle.
 Fabi & Cole, 2569 Fourth Street West, Seattle.
 Fremont Floral Co., 1401 Trenton Street, Seattle.
 Friday, H. E., Green Lake Station, Seattle.
 Furuya Co., M., Inc., 2160 Second Avenue South, Seattle.
 Gerhardt, O., Box 76, Riverton.
 Goldsack, E. H., 5639 Holly Street, Seattle.
 Hansen, H. M., 6539 California Avenue, Seattle.
 Hollywood Gardens, Inc., 1534 Second Avenue, Seattle.
 Hopkins, J., Vashon.
 Island Nurseries and Fruit Farm, Vashon.
 Lake Burren Nursery; Charles Schoening, proprietor, Seattle.
 Lakeview Nursery, 1601 Fifteenth Avenue North, Seattle.
 Lange, Paul E., 6813 Weeding Place, Seattle.
 Latona Floral Co., 347 East Sixty-fifth Street, Seattle.

Lilly Co., Chas. H., Seattle.
 Lindley Nurseries; H. M. Lindley, proprietor, Seattle.
 Madlem, Isaac F., 1208 Denny Way, Seattle.
 Malmo, Chas., 3100 Rainier Boulevard, Seattle.
 Matsuda, T., 6702 Fourteenth Northwest, Seattle.
 McClimans, D. and Linnian M., 5401 Ravenna Avenue, Seattle.
 McCoy, C. E., 4839 Brandon Street, Seattle.
 McCoy, L. W., 900 Second Avenue, Seattle.
 Melby's Floral Shop, 218 Pike Street, Seattle.
 Metzger, Frank, 3510 Holly Street, Seattle.
 Mochizuki, B., 5802 Ashworth Avenue, Seattle.
 Mochizuku, S. K., R. F. D. No. 1, Box 305, Seattle.
 Morgan, H. C., 3540 Kenyon Street, Seattle.
 Morita, M., R. F. D. No. 5, Box 388, Seattle.
 Neuse, Carl, 507 Thirty-fifth Avenue, Seattle.
 Newell, Mrs. A. B., Kirkland.
 Nishitani, D., R. F. D. No. 1, Box 92, Seattle.
 Northwest Rose Co., Stall 38, Economy Market, Seattle.
 Numakami, K., 602 1/4 North Eighty-seventh Street, Seattle.
 O'Brien, Philip D., 3118 Yesler Way, Seattle.
 Pederson, Lambert E., 2583 Seventh Street, Seattle.
 Puget Sound Nursery and Seed Co., 1622 Fourth Avenue, Seattle.
 Queen City Floral Co., 1223 East Union Street, Seattle.
 Rainier Floral Co., 500 Nevada Street, Seattle.
 Rosala, Felix, 1000 Third Avenue, Seattle.
 Saito, K., R. F. D. No. 1, Box 352, Green Lake Station, Seattle.
 Sanved Nursery Co., 1803 Thirty-eighth Street North, Seattle.
 Scott & Son, 6533 Wilson Avenue, Seattle.
 Seattle Floral Co., Fourth Avenue and Denny Way, Seattle.
 Seattle Nursery Co., 4520 Sunnyside Avenue, Seattle.
 Sheffield, Mrs. Geo., R. F. D. No. 1, Burton.
 Slauson, H. B., 5416 Morgan Street, Seattle.
 Stuber & Richardson, 4852 Holly Street, Seattle.
 Sullivan, Chas. E., 1510 Third Avenue, Seattle.
 The Burdett Co., First and Denny Way, Seattle.
 The Sunset Nursery, 4323 Fifth Street Northwest, Seattle.
 The Yokohama Nursery, Ltd., L. C. Smith Building, Seattle.
 Thomas Floral Co., 1003 Third Avenue, Seattle.
 Turner, Garrison, 4320 Fourteenth Avenue Northeast, Seattle.
 U. S. Trading Co., Pacific Building, Seattle.
 University Floral Shop, 4309 Fourteenth Avenue Northeast, Seattle.
 University Nursery and Greenhouse, 4008 Ninth Avenue Northeast, Seattle.
 Walght, Chas. H., 252 North Seventy-eighth Street, Seattle.
 Washington Floral Co., 1516 Fortieth Street North, Seattle.
 Wessman & Strander, 1905 Fifth Avenue, Seattle.
 Whendon, P., Kirkland.
 Whitney, F. A., 3846 Thirty-fourth Avenue West, Seattle.
 Wylie, Thomas, florist, 5138 Holly Street, Seattle.
 Vashon Garden Company, Vashon.

Kittitas County—

Moffet, Fred I., R. F. D. No. 1, Ellensburg.

Klickitat County—

White Salmon Nursery; Horace E. Wray, proprietor, Klickitat.

Lewis County—

Wibra, G. I., 1530 Market Street, Chehalis.

Mason County—

Brown, E. E., Detroit.

Pierce County—

Evergreen Nursery; W. H. Biddle, proprietor, 1101 South Stevens, Tacoma.
 Mainke, H. W., 1219 Sixth Avenue, Tacoma.
 McCormack Bros., Pacific and Fifteenth, Tacoma.
 Pudor, O. M., Puyallup.
 Puyallup Nursery; A. Lingham, proprietor, Tacoma.
 Rosecraft Fruit Farm; F. H. Brugelhaus, proprietor, Sumner.
 Woodland Park Floral Co., Sumner.
 Woolworth, F. W. & Co., 1106 Pacific Avenue, Tacoma.

Skagit County—

Mt. Vernon Nurseries; E. B. Chenoweth, proprietor, Mt. Vernon.
 Wingren, O. J., La Conner.

Snohomish County—

Boyd Nursery Co., Everett.
 Broadway Floral Co., Everett.
 City Floral and Seed Co.; W. Wallmark, proprietor, Everett.
 Everett Floral Co., 1814 Hewitt Avenue, Everett.
 Meadowdale Nursery; P. H. Burdett, proprietor, Edmonds.
 Ricketts, W. J., Snohomish Nursery, Snohomish.

Spokane County—

Burt, Albert J., Clemmer Theatre Building, Spokane.
 Driscoll, James, 11 West Main Avenue, Spokane.
 Hoyt Bros. Co., 11 Post Street, Spokane.
 Kelly, A. A., nurseryman and gardner, Station B, Spokane.
 Krause, H. E., R. F. D. No. 8, Spokane.
 Overman's Nursery, 29 Monroe Street, Spokane.
 Reimer's Floral Art Shop, 807 Riverside, Spokane.
 Riverside Nursery, R. F. D. No. 10, Hillyard.
 Rosalia Nursery; L. S. Kimm, proprietor, Rosalia.
 Spokane Nursery, South 2009 Grand Boulevard, Spokane.
 Spokane Seed Company, Inc., Spokane.
 The Northern Nursery, West 1104 Carlisle Avenue, Spokane.
 Turnley, J. H. & Son, North 801 Monroe Street, Spokane.
 Westlake, T. E., care Westlake Public Market.

Thurston County—

Capital City Nurseries and Greenhouse; C. Klam, proprietor, Olympia.

Walla Walla County—

Blossom Floral Co., Walla Walla.
 Young & Lester, Walla Walla.

Whatcom County—

Cornwall Park Nursery and Floral Co.; A. Allenbach, proprietor, Bellingham.
 Ferndale Nursery; J. J. Rowe, Manager, Whatcom.
 Horst's Floral Shop; Fred F. Horst, proprietor, Whatcom.
 Kincaid, J. W., Bellingham.
 McCormick, H. B., Bellingham.
 Smith, John W. Macrae, 2315 Williams Street, Bellingham.
 Thomas, Rockwell H., 1208 Sixth Street, South Bellingham.

Yakima County—

Downs, Warren, 409 South Fourth Street, Yakima.
 Hamilton Nursery Co., Yakima.
 Ornamental and Fruit Nursery Co.; John Ryken, manager, Wapato.
 Simpson, Chas. S., R. F. D. No. 1, Box 158, Yakima.
 Tate, C. P., Grandview.
 Toppenish Nursery Co., Inc., Toppenish.
 Washington Nursery Co., Toppenish.
 Yakima & Columbia River Nursery Co., 210 Miller Building, Yakima.
 Yakima Valley Nursery Co., Inc., Toppenish.

Out of State—

Albany Nursery Co., Albany, Ore.
 Birchler, H., 1406 East Stark Street, Portland, Ore.
 Bobbink & Atkins, Rutherford, N. J.
 Burbank, Luther, Santa Rosa, Cal.
 Butzer, J. J., 188 Front Street, Portland, Ore.
 Carlton Nursery Co.; F. and A. D. Brooks, proprietors, Carlton, Ore.
 Capitol City Nursery Co., Salem, Ore.
 Dreer, Henry A., 714 Chestnut Street, Philadelphia, Pa.
 Eastern Nurseries; Henry S. Dawson, proprietor, Holliston, Mass.
 Kellogg, R. M., Co., Inc., Three Rivers, Mich.
 Lewiston Flower Shop, Lewiston, Idaho.
 Milton Nursery Co., Milton, Ore.
 Oregon Nursery Co., Orenco, Ore.
 Pacific Nursery Co., Inc., Portland, Ore.
 Pilkington, J. B., P. O. Box 242, Portland, Ore.
 Portland Seed Co., Inc., Front and Yamhill Streets, Portland, Ore.
 Portland Wholesale Nursery Co., 112½ Grand Avenue, Portland, Ore.
 Quaker Nurseries; C. F. Lansing, proprietor, Salem, Ore.
 Routledge Seed and Floral Co., Inc., 169 Second Street., Portland, Ore.
 Russellville Nurseries, Inc., R. F. D. No. 1, Box 265, Portland, Ore.
 Salem Nursery Co., Inc., Salem, Ore.
 Silva-Bergtholdt Co., New Castle, Cal.
 Sonderegger Nurseries and Seed House, Beatrice, Neb.
 Stark Bros. Nurseries and Orchard Co., Inc., Louisiana, Mo.
 Sherbrooke, W. E., Cornelius, Ore.
 Taylor, H. S. Co., Rochester, N. Y.
 The Villa Nursery, R. F. D. No. 1, Box 395, Portland, Ore.
 True-to-Name Nursery, Inc.; H. S. Galligan, proprietor, Hood River, Ore.

NURSERY STOCK INSPECTED 1916.

D Indicates domestic, F foreign.

COUNTIES	Apples	Pears	Peach's	Plums and Prunes	Apri-cots	Cher-ries	Quinces	Nuts	Grapes	Rasp-berries	Black-berries	Straw-berries	Miscel-laneous Berries	Miscel-laneous Roots	Orna-mental Trees, Shrubs, Vines
Adams.....	D 448	234	54	204	129	483	1	24	100	138	22	397	158	.....	3,792
Benton.....	F 53	6	.....	12	43	8,011	6	76	2,639	70	.....	1,368	62	.....	29
Chelan.....	D 1,802	350	99	1,191	29	563	2	22	12	10	.....	2,869	.....	109	190
Chelan.....	F 337	3	211	1,715	62	110	4	102	2,108	671	35	7,513	99	86	421
Chelan.....	D 1,114	162	4	502	50	6	.....	.....	8	2	.....	4,239	95	207	18
O'allam.....	D 432	4	502	1,301	50	6	.....	63	9	788	66	3,308	170	72	213
O'allam.....	D 431	60	39	114	15	194	3	.....	8	25	.....	4,263	19	125	90
Clarke.....	F 21	2	.....	18	2	7	.....	.....	8	.....	.....	4,263	91	12	653
Clarke.....	D 176	35	83	390	17	93	3	15	2,422	53	80	299	16	209	290
Clarke.....	F 106	261	8	2,438	8	20	1	7	1,639	167	.....	9,423	204	81	616
Columbia.....	D 406	88	478	2,367	67	262	4	23	135	187	82	887	.....	.....	.....
Columbia.....	F 14	.....	.....	2	.....	3	.....	1	.....	.....	.....	572	.....	70	62
Cowlitz.....	D 38	12	25	11	.....	23	1	6	4	.....	14	892	.....	76	21
Cowlitz.....	F 40	11	33	16	7	19	2	20	25	6	7	780	.....	125	3
Douglas.....	D 105	37	21	36	13	131	1	4	6	70	12	1,200	13	.....	1,458
Douglas.....	F 135	42	18	12	2	6	.....	2	2	10	.....	1,568	55	.....	15,232
Ferry.....	D 22	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	925	.....	.....	.....
Franklin.....	D 91	22	46	35	46	74	8	25	3,509	75	18	212	64	18	1,685
Franklin.....	F 14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Garfield.....	D 146	41	68	36	18	96	6	.....	15	119	.....	116	25	100	104
Grant.....	D 653	48	35	24	537	125	2	15	2	22	12	100	15	.....	6
Grant.....	F 198	25	6	54	13	60	1	4	30	55	.....	1,000	8	351	390
Grays Harbor.....	D 269	20	24	53	52	44	.....	2	1	63	6	4,225	8	.....	303
Grays Harbor.....	F 69	13	3	26	6	20	3	3	14	93	23	4,225	8	102	1,184
Island.....	D 301	103	95	107	81	337	14	10	20	44	35	2,476	182	63	251
Island.....	F 5	.....	.....	1	.....	2	.....	2	.....	.....	.....	527	.....	.....	.....
Jefferson.....	D 293	68	85	54	7	93	5	5	29	93	2	1,706	65	.....	61
Jefferson.....	F 8	.....	.....	2	.....	10	.....	.....	.....	.....	.....	3,415	.....	55	7
King.....	D 2,798	1,112	95	370	40	1,406	24	44	71	564	31	4,783	348	408	698
King.....	F 1,755	176	253	886	140	398	78	206	208	100	.....	11,099	610	847	4,242
Kittitas.....	D 521	145	91	137	51	258	8	21	33	791	615	10,225	209	232	1,459
Kittitas.....	F 12	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	4,000	6	.....	130
Kitsap.....	D 1,095	71	160	113	9	276	12	8	104	141	4	5,520	166	214	122
Kitsap.....	F 45	1	4	10	11	.....	.....	.....	2	10	10	3,223	185	160	143
Klickitat.....	D 1,225	554	51	52	57	149	3	123	40	395	123	862	71	.....	546
Klickitat.....	F 61	3	17	231	25	40	4	651	51	71	10	3,842	3	244	186

NURSERY STOCK INSPECTED 1916.—Concluded.

COUNTIES	Apples	Pears	Peach's	Plums and Prunes	Apri-cots	Cher-ries	Quinces	Nuts	Grapes	Rasp-berries	Black-berries	Straw-berries	Miscel-laneous Berries	Miscel-laneous Roots	Orna-mental Trees, Shrubs Vines	Miscel-laneous
Lewis.....	776	217	124	176	21	298	19	15	38	498	40	3,320	235	100	117	18
Lincoln.....	287	32	16	28	14	44	...	1	14	...	12	6,008	12	228	1,045	...
Mason.....	1,202	234	261	409	133	706	15	19	132	652	95	1,340	253	147	3,840	56
Okanagan.....	47	50	30	29	39	60	2	3	2	...	12	1,400	88	10	1,100	...
Pacific.....	125	18	1	2	3	68	...	8	1	3	...	1,124	...	...	...	...
Pend Oreille.....	4	1	5	3	...	...	1	70	25	...	114	1,250	144	81	756	8
Pierce.....	3,875	121	158	91	20	322	7	32	201	348	2	2,570	151	2	107	...
San Juan.....	309	22	18	16	5	21	4	6	32	25	21	291	6	167	167	83
Stag't.....	234	36	5	26	1	20	1	...	14	55	53	8,315	162	168	133	...
Stamania.....	100	15	10	46	3	20	...	...	21	27	111	9,417	132	87	235	8
Spokane.....	504	46	24	159	...	8	1	...	76	527	...	1,562	12	110	14	...
Stevens.....	80	20	...	26	...	...	...	...	4	20	...	1,710	327	574	362	81
Thurston.....	1,017	482	104	948	40	613	24	38	74	807	15	6,050	4,901	1,497	1,741	...
Wahkiakum.....	502	186	155	508	1	290	1	5	798	146	544	2,450	62	550	67	6
Walla Walla.....	106	102	10	28	46	172	5	2	6	24	6	5,060	232	324	223	27
Whitman.....	806	218	532	296	81	442	86	27	44	374	84	2,162	...	135	339	...
Yakima.....	43	7	...	64	...	16	...	...	...	...	...	...	...	...	...	...
Totals.....	35,336	14,478	8,650	24,868	3,280	21,095	621	2,650	19,406	11,775	8,174	50,068	13,610	12,221	57,882	633

NURSERY STOCK INSPECTED 1917.

D indicates domestic, F foreign.

COUNTIES	Apples	Pears	Peach's	Plums and Prunes	Apri-cots	Cher-ries	Quinces	Nuts	Grapes	Rasp-berries	Black-berries	Straw-berries	Miscel-laneous Berries	Orna-mental Trees, Shrubs, Vines	Garden Roots	Peren-nials and Miscellaneous
Adams.....	D 5	2	1	1	1	3			12	30		538		306	112	71
Asotin.....	D 12	1		4		11					1	6	24	119		10
Benton.....	D 2,150	11	538	1,883	231	2,039		51	727	84		379		197	112	18
Chelan.....	D 12,768	1,031	448	4,111	1,055	66	8	81	1,904	28	4	443		85	146	8
Clarke.....	D 103	82	86	775	19	36	5	16	28	22	22	1,135	24	64	55	2
Oallam.....	D 2	2	1	3		3	1	1	1	20		629		29	110	3
Columbia.....	D 19	6										456		1		
Cowlitz.....	D 84	12		983		17			60	3,100		500	172		55	77
Douglas.....	D 2,075		6	9	2	32			5	10	4	1,376		21		3
Douglas.....	D 18			7	2	5		10	4	14	2	170	1	17	55	
Ferry.....	D 4											371				
Franklin.....	D 2			3	4	2								16	2	
Garfield.....	D 17	3		1		10		3	12	10		415		26	55	6
Grant.....	D 22	3	8	1	2	10		2				1	1	8	2	1
Grant.....	D 5	4	5	1	1											1
Grant.....	D 4	4		3										855	20	11
Grays Harbor.....	D 9	8	16	9	8	3	2	2		10	4	5		356	279	24
Island.....	D 229	32		59	1	62	1	4	21	30	16	1,605	190			234
Jefferson.....	D 2					5			2			2		6		8
King.....	D 125	2		28		2		4						1		7
King.....	D 731	2		28	4	274	6	9	88	102		461	80	102	55	24
Kittitas.....	D 2,968	931	59	2,186	27	1,823	61	67	538	151	16	1,645	114	450		1,171
Kittitas.....	D 77	8	10	8		22						365		2		12
Kitsap.....	D 72	14	7	19	1	23			28	48	25	3,400	8	21	33	32
Klickitat.....	D 86	12	3	3	2	1			40	20		393		21	50	2
Klickitat.....	D 2	1	1	4	2	14			6	6	1	12		12	20	
Klickitat.....	D 66	665	69	115	29	56	2	4	78	20	66	1,024		69		

NURSERY STOCK INSPECTED 1917.—Concluded.

COUNTIES	Apples	Pears	Peach's	Plums and Prunes	Apricots	Cherries	Quince	Nuts	Grapes	Raspberries	Blackberries	Strawberries	Miscellaneous Berries	Ornamental Trees, Shrubs, Vines	Garden Roots	Perennials and Miscellaneous
Lewis.....	D 267	65	20	99	28	3,075		57	46	63	30		48	427	55	8
Lincoln.....	D 84	10	2	15	6	6	1					350	599	59		82
Mason.....	D 73	64	312	26	37	28	5	1	151			660	160	57	315	25
Okanogan.....	D 2	18	22	23	9	31	5	29	47		8	16	20	22	9	22
Pacific.....	D 395		12	6	6	10	3		59	20		351	35	35	105	11
Pend Oreille.....	D 9	3		6		1			11	10		1,315	24	324	16	5
Pierce.....	D 27	4		25		13				68		371	38	11	30	
San Juan.....	D 182	23	52	38	2	49	2	10	37			1,350	37	37		11
San Juan.....	D 745	155	44	217		507	20	3	2,410	1,462	1,100	819	2,086	3,035	103	1,378
Skagit.....	D 188	166	16	11	8	91	7	17	5	233		3,539	62	249		8
Skamania.....	D 321	2	8	13	10	303		3	4	23		486	431	97	102	43
Snohomish.....	D 193	89	36	2	4	3	5	10		12		300	13	40	100	3
Spokane.....	D 65	19	16	20	2	46		8	2	182		212	5	38		14
Stevens.....	D 857	237	8	767	103	386	2	4	150	164	200	3,047	1,602	668	2,414	190
Thurston.....	D 8	12	4	4					10	22		2,199		4	55	
Wahkiakum.....	D 75	8	6	1	1	23		49	97	513	188	3,250	2,174	21	21	14
Walla Walla.....	D 89	38	14	73	15	304	5	2	8	106	13	1,011	59	64	200	18
Whatcom.....	D 6	1	5	22		1		6		6	1	1	1	1		2
Whitman.....	D 27	15	20	24	6	32	6	5	1,036	10		872	10	23	16	2
Yakima.....	D 83	10	37	102	2			37	16	791	1	952	283	664		62
Totals.....	D 293	240	18	53	45	191	7	1	30	156	16	2,487	2,174	1,380	75	796
	D 206	614	5	107	244	5	1	6	12	12		100		42	73	1
	D 33	39	1	65	31	37	2		196	24	9	899	64	234	90	53
	D 146	22	6						3,806	554	158	3,590	4,887	855		228
	D 4,546	15,293	1,706	19,768	380	2,384	106	384	887	8,311	1,957	43,450	15,255	12,015	5,146	5,236

POTATO INSPECTION.

No branch of the inspection work is given closer attention than is the potato inspection, especially that part of it in connection with the inspection of California potatoes against the introduction of the potato tuber moth.

For four consecutive years Mr. F. N. Rhodes, inspector of the ninth district, has spent from four to eight weeks in California in the tuber moth infected districts inspecting shipments destined for Washington and other northern sections. Realizing what the injury to the early potato trade in Seattle and other points would be if the state placed an embargo upon California potatoes for its own protection, the dealers and commission merchants guaranteed to furnish expense funds for the maintenance of Mr. Rhodes in California during the shipping season of early potatoes, for the purpose of inspecting all shipments destined for Washington and other northwestern points. Their request has been granted. During his four years' work in the California fields we have been able to prevent any known infestation to become established in this state. Mr. Rhodes' personal report for 1918 explains the situation in detail:

Seattle, Washington, September 24, 1918.

Mr. M. L. Dean,
Chief, Division of Horticulture,
Olympia, Washington.

Dear Mr. Dean: I left Seattle, May 17th, 1918, for San Francisco, driving a Ford touring car from there to Los Angeles, a distance of 440 miles, going via Stockton, Merced, Fresno, and Bakersfield, arriving at Los Angeles May 23d, and inspected the first car of potatoes the following day. I saw from the very first inspections that the tuber moth was to be much more serious than any of the other three years I had been in California. During my five weeks' stay in the southern part of the state I visited and inspected many potato fields as well as carloads in the vicinity of Los Angeles, Beuna Park, Norwalk, Stanton, Fullerton, Anaheim, El Monte, Savannah, Baldwin Park, Arcadia, Pomona, Ontario, Chico, Upland; several places in San Bernardino County as far up as San Jacinto, a distance of about 120 miles from Los Angeles, also many potato growing sections in what is known as the San Fernando Valley. I traveled by auto about 3,000 miles from Los Angeles, Orange, and San Bernardino counties. By having my auto with me I was able to cover a great deal more ground this year than other years when I had to depend on being taken to the different districts where cars were being loaded by the shippers. I was asked to pass on a field of twenty-seven acres of potatoes at Pacomia in the San Fernando Valley, and upon inspection found the potatoes so badly infected with tuber moth as to be nearly worthless. This Japanese grower had paid \$2.00 per sack for his seed, the field would average fifty sacks to the acre, yet he lost 90 per cent of the entire crop because of the serious tuber moth infection, many of the potatoes having as many as fifteen larva in them, and they were surely unfit for human consumption. I saw several fields of potatoes in the same district which were also in very bad condition. This district had tuber moth every year. Had the conditions this season been such that the movement of Southern California potatoes had been slow there certainly would have been a large loss from tuber moth, but the demand was strong and potatoes moved out fast.

I invariably found that the principal causes for tuber moth infection in Southern California to be: First, shallow planting, exposing the potatoes to attacks of the adults of moths which are night flyers and at which time many of the eggs are deposited on the exposed potatoes. Potatoes grown on heavy, cloddy land which bakes and cracks would invariably be found to be infected, and shallow planting on fine sandy soil would occasionally show some infection, but where the potatoes were on sandy soil and five and six inches deep,

which was the case in a number of places, there was little and no infection in the early crop because neither the moth or the larva can get at them at this depth. I do believe that were potatoes in Southern California planted four to six inches in depth and grown only on fine sandy soil and when dug put in new bags, and taken off the field the same day, or else kept well covered, there would be little or no trouble on account of tuber moth. I have seen two fields of potatoes separated only by the highway, the soil in one field was fine sand and showed no tuber moth whatever; the soil in the other field was heavy, had become baked and cracked, giving the moth and larva an easy access to the potatoes, and these certainly were quite wormy. These southern potatoes should be dug and marketed as soon as they will stand shipment, and should not be held at all.

In San Joaquin County, where potatoes are grown on the delta or what is known as river lands, where plenty of water is usually to be had, I seldom found the tuber moth in the early potatoes, but when grown on the higher dry lands where water is not plentiful they generally show some infection. San Joaquin County potato acreage this year is 20,000 acres, against 25,000 acres in 1917, and the average yield will go 125 sacks per acre, and I understand Geo. Shima, the California potato king, as he is termed, controls 7,500 acres out of the 20,000 acres. The yield in the Los Angeles district is not more than thirty to thirty-five sacks per acre.

I issued certificates as to the freedom from tuber moth on 206 carloads of spuds which were shipped to Washington, Oregon, Utah, Montana, Idaho, and Texas, and refused certificates on forty-five cars and in addition examined about twenty-five cars which were finally not shipped into territories requiring certificates. Figuring on an average of ten sacks cut and examined to each car I examined a total of 2,750 sacks, many times examining nearly all the potatoes in a sack. On a money basis of \$800.00 per car right through, the total value of potatoes examined would be \$220,000.00. Many cars of potatoes this season were from ten to eighteen days in transit to Washington points, when seven, eight, and nine days should have been the limit of time in transit. When a car of potatoes was inspected and passed at shipping point and reached destination in this state in six or seven days there would be little or no danger of eggs hatching and potatoes becoming infected in transit, but when a car is eighteen days in transit, as was the case in one car, there can be no assurance that potatoes would arrive at destination free from infection. California potatoes, especially, certainly should never be delayed in transit where it was possible to get them through, because aside from the danger of tuber moth hatching in transit the disease known there as "leakers" develops very fast in cars delayed in transit. Two years ago the icing of Southern California potatoes was unknown; this year practically all southern stock moved to market under ice, which was a saving of many thousands of dollars to growers and shippers.

This year there were many more small potato growers in Southern California than other years, and a number of cars of potatoes contained as many as eight different growers, thereby making the thorough examination of a carload next to impossible.

For thorough inspection purposes not more than three to five different growers should be allowed in the same car, and then only one grower's stock on the floor of the car and the other grower's stock on the top decking and each lot marked, number of sacks, etc., so as to distinguish one from the other. Two certificates should be issued, one to attach to bill of lading, the other securely tacked on the inside of the car door.

The season is now over for California potatoes, and from the first shipment in May to date, Seattle received 254 carloads.

Yours truly,
(Signed) F. N. RHODES,
Horticultural Inspector.

"Safety First" is the motto for the State of Washington in connection with this tuber moth situation. We are yet free of this dangerous pest, and unless California revamps her laws so that thorough, drastic inspection by the state

officials can be given, it will be necessary for Washington to adopt rigid measures for our own protection, even to the extent of placing an embargo upon all potatoes produced in the State of California.

Occasionally shipments have been sent from points which Mr. Rhodes could not reach. This season several cars were received with certificates of county inspectors attached, which were so seriously infected that they were either returned to the shipper at his expense, or diverted to other states, or confiscated. The state inspection authorities of California should have jurisdiction over these matters for their own protection.

FEDERAL GRADES.

The federal grading of potatoes was brought to the attention of the growers and dealers during the season of 1917. In co-operation with the state division of farm markets, under the direction of Mr. Asher Hobson, located at Pullman, inspection of car lot shipments was advocated and upon request of the grower, shipper, or dealer, inspection service was rendered.

The federal grading of potatoes is an advanced step toward better marketing conditions. The time is at hand when all farm products should be marketed under standard grades.

THE COLORADO POTATO BEETLE.

In July, 1916, an outbreak of the Colorado potato beetle was reported from Sunnyside.

Immediate attention was given the matter under the direction of F. E. De Sellem, who was then district inspector of district No. 5, in which the outbreak occurred. A force of men was put into the potato fields picking and destroying all adults, larvae, or eggs found. The potato fields were also carefully sprayed with arsenical sprays. A protective potato association was organized in the district and through their efforts in assisting the inspection force the work was very thoroughly carried out in 1917, with the result that but very few adults, larvae, or eggs were found. In 1918 none were found in that district, but in the second district in the vicinity of Walla Walla, an outbreak was discovered. Harry L. Miller, district inspector of that district, immediately took drastic measures, having all the fields and adjoining territory carefully gone over, and all fields of potatoes in which the beetles were found were thoroughly sprayed with arsenate of lead.

From these occurrences it is evident that similar outbreaks of this pest are likely to occur and it behooves every potato grower to report any findings of the pest at once to this department in order that measures may be taken to prevent its spread. Each year that this pest is kept out of the potato fields of Washington means the saving of thousands of dollars to the growers in the cost of spray machinery, material, and labor.

The commercial shipments of potatoes for the year 1917 as reported by the several railroads in the state was 3,148 carloads, representing about 2,500,000 bushels. The value of this crop based upon the prices received represents an income that should not be placed in jeopardy by the activities of the Colorado potato beetle.

GRADE AND PACK CONFERENCE.

Under the provision of the law which provides for the grade and pack conferences, a meeting of growers and delegates was held at Spokane, November 25, 1916, at which time the regulations were formulated for the pack of 1917.

November 23, 1917, a similar meeting was held at the same place, at which time the 1917 grade and pack regulations were adopted for the 1918 crops. A very interesting discussion of "Federal Grades," promulgated by the Federal Bureau of Markets, was had during the meeting. Mr. S. H. Boddinhouse represented the federal department, and after freely and fully placing the matter before the meeting, promised further investigation of the question in other apple producing sections, hoping that in the near future federal apple grades would be nationally adopted.

STORAGE.

That proper storage facilities is one of the important adjuncts to the fruit industry cannot be denied. In all of the fruit districts of the state there should be more up-to-date storage plants.

It is not necessary that they be expensive iced storage structures, because frost-proof houses are being built with air-cooled ventilating systems which are giving satisfactory results.

In 1917 there were many more storage plants built, including commercial plants and common air-cooled houses in the different valleys than had ever been built in the state during a single season. Weather conditions and car shortages made the demand for more and better storage facilities imperative. Heavy losses during former shipping seasons were the result of insufficient storage facilities, and had it not been for the war conditions many houses of different types would have been built in 1918. There were some built.

The fruit tonnage is gradually increasing in the fruit sections, which makes a demand for increased storage facilities.

The following data was gathered during 1917, showing the available storage facilities and its distribution throughout the state:

STORAGE CAPACITY REPORT.

DISTRICT	Number Houses	ICED STORAGE		Temporary or Common Boxes	FROST PROOF	
		Boxes	Sq. Ft.		Boxes	Sq. Ft.
1.....	29		256,140	242,000	185,500	
2.....	12		57,832		80,000	121,300
3.....	20	19,000			188,000	
4.....	68				1,875,000	
5.....	64	1,896,500		24,000	1,568,000	
6.....	7				17,000	
7.....						
8.....	5	108,000	40,967			150,000
9.....	4	528,500	202,045	26,373,900		163,070
10.....						
Totals.....	209	2,542,000	300,844	26,639,900	3,864,460	334,370

GREENHOUSES.

The greenhouse interests of the state are becoming to be of a considerable magnitude. Specialized florists are the greatest in number, yet many are growing both flowers and vegetables, some growing vegetables exclusively.

The growing of rhubarb and asparagus under glass or in sheds is very remunerative in several sections of the state.

The following table shows the value of the greenhouse industry to the state:

GREENHOUSE REPORT.

DISTRICT	Number of Green-houses	Assessed Valuation	Square Feet Glass	Volume of Business in 1917
1.....	8	\$66,184 00	199,350	\$82,845 63
2.....	23	88,211 00	339,500	124,650 00
3.....	1	800 00	1,800	1,200 00
4.....	1	2,010 00	3,500	20,000 00
5.....	4	27,380 00	96,000	24,600 00
6.....	4	2,650 00	15,300	6,500 00
7.....	9	18,600 00	89,100	22,200 00
8.....	23	37,575 00	383,464	67,781 00
9.....	66	334,380 00	714,850	237,939 71
10.....	10	12,020 00	153,900	89,700 00
Totals.....	149	\$594,811 00	1,993,764	\$627,416 34

FRUIT PRODUCTS.

Probably no branch of the fruit industry has been more neglected in this state than that of the manufacturing of fruit products. There was a great development of these interests in 1917 and many plants of various kinds were put into operation. New canning plants, evaporators, juice factories, cider mills, and factories for the making of various other fruit products were built in many parts of the state. Where new factories were not built, unused buildings were remodeled and made into successful plants, until now there is a sufficient capacity for the manufacturing of these products to create a demand for all cull fruit in the state at remunerative prices. More plants are contemplated and in the process of construction for the 1919 campaign.

In 1915 cull fruit for cider purposes brought to the grower about \$4.00 per ton. In 1917 it ranged in price from \$7.00 to \$10.00 per ton, some factories paying as high as \$15.00 per ton and sent auto trucks to the orchards after them. The 1918 culls are bringing from \$8.00 to \$25.00 per ton, depending upon quality. The development of this branch of the fruit industry placed upon the market finished products which brought into the state several millions of dollars, and makes a home market for a grade of fruit which heretofore has been nearly a total loss to the grower.

The following table gives an idea of the scope of the industry. Yet it is difficult to get the tonnage consumed each year because of the rapid increase in the number of plants. At Sumner and Puyallup extensive canning plants have been in operation for several years. There is also a branch of

this concern operating in Spokane. Libby, McNeill & Libby erected a large factory at Yakima in 1917 which consumed vast quantities of apples, pears, cherries, peaches, plums, apricots, and beans. Other products will be used by this plant as its equipment can be increased. There is also an extensive canning plant at Vancouver, and many smaller plants can be found in different parts of the state. The Washington Evaporated Food Company erected a large, commodious evaporating plant at Yakima in 1917 which consumed vast quantities of cull apples and vegetables. After the fruit season ended this plant did an extensive business in the evaporating of potatoes.

The largest fruit juice factory is at Olympia. They have a capacity of four to six thousand tons of apples annually. There are many other small cider and vinegar plants in the state:

FRUITS CONSUMED FOR BY-PRODUCT PURPOSES IN 1916 AND 1917.
(Tons)

District and Year	Apples	Pears	Peach's	Plums, Prunes	Apri- cots	Straw- berries	Black- berries	Rasp- berries	Cher- ries	Grapes	Logan- berries	Small Fruit	Miscel- laneous
District 1—													
1916.....	633	18	2						30				
1917.....	300												
District 2—													
1916.....	5,957	12		20		24			92			13	
1917.....	3,627												
District 3—													
1916.....	141				71½					43			
1917.....	140									205			
District 4—													
1916.....	4,198												
1917.....	2,261	10	17										
District 5—													
1916.....	2,010												
1917.....	15,753	1,865	906						8,133				
District 6—													
1916.....	300	45		10	7	9	9	5	34		15		11
1917.....	450	70		40		30	12	16	39				
District 7—													
1916.....	300	150	30	110	15	150	90	45	165	15	90	92	71
1917.....	450	180		300		180	150	75	375	45	75	19	
District 8—													
1916.....	2,490	183	1			221	1,023	1,490	111			53	374
1917.....	2,318	150	68	31		150	1,024	450	164			231	
Districts 9 and 10—													
1916.....	696	305½	3	6	20	55	31	156	109	14	53		53
1917.....	1,778	434	29	35	150	110	85	32	270	44	11		

FRUIT EXPORTS.

In the value of production among the orchard fruits of the State of Washington the apple ranks first, the pear second, prune third, and the peach and cherry are close competitors for the next place. The apple has a wider range of adaptability than any of the other tree fruits and can be successfully grown under conditions which are directly adverse to some of the other fruits.

The age of the oldest apple trees in the state date back to the years 1825 and 1835. It is not difficult to find fruit trees in several parts of the state in good condition which were planted about that time. In 1854 a nursery was established near Olympia, where apple trees and other nursery stock was grown. In 1849 grafted fruit trees were generally distributed from this territory over the western part of the state. At that time about every variety known to the people living in the country was propagated and sold; hence there is a wider range of varieties in the older orchards. During the rapid development of the apple industry in the central and eastern portions of the state, beginning about 1900, the bulk of the trees in the state were planted, and the list was restricted to commercial varieties. The height of planting was reached in 1908 to 1910, and since that time planting has gradually dropped off until now the trees planted each year about equals those being taken out by natural conditions or otherwise. Of course, there are intermittent periods of activity in the planting of other tree fruits.

In 1910 Washington ranked sixteenth in importance as a fruit growing state, New York standing No. 1 and Missouri second from the standpoint of production. In 1917 Washington took the first place and produced more than a half million boxes more than New York and Virginia combined, which represented 19 per cent of the commercial crop of the country and 53 per cent of the boxed apple crop.

The commercial crop, indicated by the carloads for 1916 and 1917, is given in the following table; 1916 is based upon 650 boxes to the carload, 1917 at 756 boxes per car:

CARLOAD FRESH FRUIT EXPORTS FOR YEARS 1916 AND 1917.

District and Year	Apples	Peaches	Pears	Plums, Prunes	Cher- ries	Apri- cots	Grapes	Cur- rants	Goose- berries	Black- berries	Red Rasp- berries	Gran- berries	Logan- berries	Straw- berries	Canta- loupes	Mixed
District 1—																
1916.....	635	52	8	350	63	8	9									1½
1917.....	500	58	10	203	121	10	11									
District 2—																
1916.....	980		14	23	8									80		384
1917.....	472		8	15	14									3		290
District 3—																
1916.....	448	52	113	14	4	15	16							110		8
1917.....	901	170	150	7	7	6	29							50		
District 4—																
1916.....	7,721	178	843	23	93	80										
1917.....	7,225	103	275	13	85	58										598
District 5—																
1916.....	7,090	950	1,150	210	20	25	20	35								
1917.....	9,122	1,965	2,126	263	135		5								225	
District 6—																
1916.....	221	18	17	350*	2	6								40		8
1917.....	240	9	16	420*	1	2								35		16
District 7—																
1916.....	15	100†	8	8	7		1		8	4	1	2,000†	5	9		
1917.....	15	200†	6	10	14		2		10	7	2	3,500†	3	12		
District 8—																
1916.....	400		50	30	230			6	7	451	640		25	150		
1917.....	500		40	20	200			6	8	400	540		20	120		
District 9—																
1916.....	263	3	53	87	76			2	2	35	79		48	152		
1917.....	103	4	7	50	24		1	2	2	24	63		55	198		
District 10—																
1916.....																
1917.....																
Totals.....	37,426	3,571	4,384	2,091	1,109	210	94	51	37	951	1,325	5,500	156	909	22	296½

* Dry. † Box. ‡ Bbls.

STATE INSECTICIDE LAW.

The enforcement of the insecticide and fungicide law is a part of the duties of this division. The law creates a board, "which board shall consist of the Commissioner of Agriculture or the Assistant Commissioner, the director of the agricultural experiment station at Pullman, and three members of the agricultural experiment station to be appointed by the director, one of whom shall be an entomologist, one a plant pathologist, and one a chemist." The present personnel of the board is Prof. Geo. W. Severance, director of the experiment station; Dr. A. L. Melander, entomologist; Dr. F. D. Heald, plant pathologist; Prof. George A. Olson, chemist, and M. L. Dean, chief, division of horticulture.

All spray material sold or used in the state comes under the regulation of this board and must conform to its fixed standards. Samples may be analyzed by Chemist Geo. A. Olson, located at Pullman, at any time.

Each year the horticultural inspectors gather samples found upon the markets or in the orchards, have them analyzed, and if they are not up to requirements, their further use is prevented.

Frequently people think that they do not get proper results from the use of the spray materials which they use. If they will call the attention of the inspector of their district to the situation he will investigate the matter and determine whether the results obtained are due to adulterated material or to some other cause.

FAIRS.

As the State Fair is an adjunct to this department, the horticultural division each year installs and maintains an educational exhibit showing the different diseases and insect pests. Different spray accessories such as material and nozzles are shown; circulars and bulletins treating upon horticultural topics are freely distributed. Personal information is also given out in the way of discussion and the answering of questions.

The district inspectors in co-operation with commercial clubs, county fair associations, and county agents, render much assistance in the gathering and installation of county exhibits at the State Fair. In 1917 in the third district, Luke Powell, the district inspector, represented Benton County. I. R. Fletcher of Vancouver, together with Chat Knight, local inspector for Clarke County, made an exhibit from that county. E. F. Perry of Chehalis, in the seventh district, made an exhibit of charts, plates, and diagrams describing the principal diseases of fruits, potatoes, and other vegetables at the Southwestern Washington Fair, the Western Washington Fair at Puyallup, and the county fairs at Elma, Grays Harbor County; Morton, Lewis County; Shelton, Mason County, and Port Angeles, in Clallam County. Henry Huff of the eighth district, located at Sumner, represented Pierce County. F. N. Rhodes and J. C. Eakle of Seattle made a display for King County.

In 1918 the above mentioned counties were represented. Mr. E. F. Perry assisted the Southwestern Washington Fair Association in making a very elaborate display. Mr. Huff assisted Mr. J. M. Hutchinson in making a display from Jefferson County. Other counties were represented at the fair, in which the inspectors rendered more or less assistance.

The chief of this division and the district inspectors each year are called upon to act as judges in the awarding of prizes in the agricultural and horticultural divisions at the county fairs in many parts of the state.

Encouragement of local fairs and participation in the State Fair is a part of the work of all employees of this division because the fairs are deemed of very great importance in the agricultural development of the state.

Respectfully submitted,

M. L. DEAN,

Chief, Division of Horticulture.

SEED LABORATORY REPORT.

REPORT OF THE SEED LABORATORY FOR THE PERIOD JULY 1, 1916-
JUNE 30, 1918.

NUMBER OF STATES WITH SEED LAWS.

Washington is one of twenty-six states having seed laws. The states are: Nebraska, Wyoming, Oregon, Iowa, in which the laws are administered by the dairy and food commission.

North Dakota, Montana, Idaho, New Jersey, Kentucky, Minnesota, under the jurisdiction of the state experimental station, but in most cases under a seed commissioner.

North Carolina, New York, New Hampshire, Ohio, Tennessee, Maine, Wisconsin, Pennsylvania, Michigan, South Carolina, Washington, Maryland, Louisiana, Vermont, Virginia, and West Virginia, the work is under the state department of agriculture, as also in several instances are the states which are administered through the dairy and food commissioner.

Six come under the experimental station and twenty, either directly or indirectly, under the department of agriculture.

THE LAW OF THIS STATE.

The principal provisions of the law are as follows:

1. The inspection of commercial seed exposed for sale in the various seed markets of the state.
2. The correct labeling of all seed sold or offered for sale in the state, provided same is sold in packages of one pound or more.
3. That seed offered for sale within the state must not contain the following weeds: Canada thistle, wild oats, dodder, corn cockle, wild mustard, charlock, or quack grass.
4. The establishment of a laboratory to test seed for the citizens of the state.
5. The enforcement of the law and penalties for the violation thereof.

THE LABORATORY.

The seed laboratory is well equipped and similar in every respect to those in use by the United States Department of Agriculture; we are prepared to give seeds both the purity and germination test, and further in every way possible, the improvement and safeguarding of Washington agriculture along agronomic lines.

SUBMITTING SAMPLES.

Tests are made gratis to all bona fide users, while commercial seed houses and growers are required to pay a fee of 50 cents for a purity and germination test. Samples of seed submitted for test must be representative of the lot from which they are taken. If taken from a sack with a sampler, some should be taken from the top, center, and bottom of the sack, and at least 5 per cent of the sacks constituting the lot be so sampled; from the amount

obtained a thoroughly mixed sample should be taken. The same holds good for samples taken from bins.

About a good sized handful should then be carefully sealed and mailed to the Department of Agriculture at Olympia, accompanied by a letter stating the test desired, also the name of the seed and the name and address of the sender. Tests are immediately made and results reported.

LABELING.

One of the most important provisions of the law is labeling, as it constitutes one of the strongest safeguards possible to protect the purchaser. Seed should be labeled "Standard" if sufficiently good to warrant such labeling; if not, it must be labeled with the actual percentage of purity and germination.

In the inspection work failure to comply with the law in this regard is more noticeable than any other departure from the regulations. The larger and more important seed houses scrupulously comply with this regulation, but the small dealer does not appear to thoroughly appreciate the importance of the requirement. The method of labeling is left very largely to suit the convenience of the individual, but it must comply with the law.

ADULTERATIONS.

The commercial seeds commonly adulterated are: Red clover, white clover, alfalfa, red top, bent and Kentucky bluegrass. In the case of alfalfa, burr clover, sweet clover, and trefoil are used. In adulterating red clover, alfalfa, sweet clover, and yellow trefoil are the favorites. Red top may have timothy mixed with it, while red top is very frequently mixed with, or substituted entirely for, the bent grasses. Kentucky bluegrass is frequently adulterated with Canada bluegrass, a much inferior grass.

SOURCE OF SAMPLES.

In the two years practically two-thirds of the samples were collected by inspectors; almost twice as many were sent in by dealers as by farmers, but in 1917-1918 the farmers increased their samples while the dealers decreased, with the result that there was only a slight difference between them. Neither, however, use the laboratory as they ought, but this is because so many people in the rural districts know nothing about the existence of laboratory, and these are the very people whom we wish to reach.

Table No. I, showing the number of samples submitted from different counties during the biennium, indicates how inadequate the inspection of seed stocks really is, and shows how impossible it is to do the work with the present resources. Thirteen counties producing farm crops to the value of \$43,000,000.00 annually were not once visited by an inspector, nor was one sample of seed sent to this department for test during the two years. Ten other counties with farm crops to the value of \$40,000,000.00 were hardly inspected at all; none of them furnished more than ten samples for test during the two years. It is urged that some provision be made to remedy this state of affairs.

Table II shows the importance of Washington as a seed producing state. In some cases practically all seed produced in the United States is grown in this state.

Table III is the result of a questionnaire sent out from this office to the various county agents of the state, and thanks are due to those gentlemen who courteously and in a spirit of co-operation gave us the information thus accumulated. Some of the most important seed producing counties, and those in which the industry shows great promise, failed to furnish any data. The La Conner flats in Skagit County is one of the two districts in the United States where it is possible to produce first class cabbage seeds. The writer also saw some very fine sugar beet and sludstrup mangold seed produced there, which in itself gives promise of a lucrative industry. Mr. Alexander of La Conner produced sludstrup seed at the rate of 3,700 pounds per acre, and of excellent quality.

In the eastern section of the state many farmers instead of letting the summer fallow lie idle, have been growing the legumes, beans, and peas. As that mode of farming gives promise of being extended, and in consideration of the feeding value of horse beans and peas, there seems some future for those crops in that district.

In the vicinity of Pullman and Ritzville the soil and conditions are conducive to the successful raising of high grade seed potatoes. Already in the southwest section of the state, in Clarke and Cowlitz counties, large acreages of potatoes are grown and shipped to California for seed purposes. Whatcom and Spokane counties produce large quantities of seed peas, Spokane County this year producing upward of 4,000 acres. As a result of great variety in soil, climate, and elevation, the seed possibilities in Washington are excellent, and the prospects of financial returns are alluring. For every bushel of seed raised in this state for home use or for shipment elsewhere, just so much do we arrest the importation of weak, unacclimated seed, and good, vigorous weed seed which will flourish because of the absence of natural enemies and drawbacks sustained in its former habitat. Therefore, by every means in our power, we should encourage and assist the production of home-grown seeds.

Table No. IV shows the comparison of the purity conditions as found in clovers and alfalfa in the last four years. Alfalfa has retained its purity in good shape, but during the last year red and white clover have depreciated considerably. The red clover situation this year is somewhat unusual, as, owing to the great scarcity in the west, a considerable proportion of our requirements must come from the middle western and eastern sections of the country, and we do not expect the quality will be as desirable as our local grown material. A perusal of the chart will show that in every case, with the exception of this year's red clover, a safe margin over the minimum requirement is observed.

Table No. V covers the same ground in relation to the grains and grasses as does No. IV to clovers and alfalfa.

PERCENTAGE OF WEEDS IN SAMPLES.

Table No. VI is worthy of very special consideration, as it shows to what an alarming degree some of the worst weeds in the state are increasing in the various samples tested in this laboratory. There are two ways of regarding this; either is alarming. Either the seedsmen are less careful of their offerings, or, owing to the increased home production, the farmers unknowingly are growing more and more weed seeds, each year worse than

the one previous. The situation in some cases is very bad and warrants drastic measures. Under our present law it is not compulsory to state on the sample where the seed was grown, hence we have no means of checking up the source from which the seed came. This section of the law should be amended in order to make that necessary.

The case of sheep sorrel in white clover is very noticeable. Curled dock and plattain buckhorn are prominent in nearly every sample examined. Under the noxious weeds the most remarkable increase is that of dodder and wild mustard.

WEED CONTROL.

The above facts emphasize the necessity of the state acquiring control of the weed situation, with jurisdiction to act as occasion demands in precisely the same manner as the horticultural department would regulate an outbreak of fire blight, or cause a dirty and neglected orchard to be cleaned up. It is a grave injustice to the good, careful farmer to put him at the mercy of the shiftless, careless fellow who may happen to be growing a crop of weeds in his vicinity. Time, labor, and material are too precious, especially under present conditions, to permit of such a waste. Several states already have passed laws vesting the control of weeds in the State Department of Agriculture, prominent amongst them being Michigan, Wisconsin, Minnesota, and North Dakota. This transfer has removed a very important work from the realm of local politics and placed the regulatory work under impartial administration.

INSPECTION WORK.

The work of inspection has been accomplished under great difficulty. Owing to the fact that no appropriation has been made for the maintenance of this section, all expenses incurred have been borne by the fourth division; consequently, only a very small portion of the state has been visited. The principal towns and cities have, however, been visited, and in that way a check has been kept on wholesalers' stocks and occasional prosecutions made.

Definite lack of knowledge of the various seed houses and seed dealers doing business in the state has been a serious handicap, and it is to be hoped that at the legislature shortly to convene provision will be made for the licensing of every one selling seeds in the state, and that railroads will be required to refuse for shipment or delivery all seeds not properly labeled and stamped with the dealer's license. This will enable the department to keep a check on the quality of the material sold in the state by foreign concerns. On inspection trips nearly all seedsmen have this complaint; it is well founded and worthy of consideration. Foreign dealers will sell a chain of small towns a very inferior seed which has not been inspected by the department prior to distribution by the wholesaler, and which, when once in the hands of the small retailer, is almost immune because of the lack of funds to enforce the inspection law.

The State of Washington produces annually cereals and hay to the value of more than \$150,000,000.00, besides which many acres are ploughed under or fed green for fodder. Inspection of the seed for planting the enormous acreage necessary to produce this amount is urgently required if the best results are to be obtained. A glance at Table No. V or Table No. VII will show

how few samples of cereals are inspected or tested. It is essential that steps should be taken to remedy such conditions. Some cereal seed stocks recently inspected showed 2.62 per cent of wild oats present. The state law prohibits the sale of seed containing this noxious weed, yet it is the exception to find rye and oats which do not contain a very heavy trace of wild oats. The farmer who pays 6 cents per pound for wild oats gets a poor bargain.

Section 3062 (paragraph 5) is a weak section of the law and one which savors of class legislation. It is unfair to the seedsman and the good farmer. The fact that a man raised the seeds should be no excuse for him selling an inferior article and jeopardizing the fruit of another's labor.

EDUCATIONAL WORK.

One of the most pleasant phases of the work is the opportunity which exists to give farmers and seedsmen a little occasional advice, because, after all, this work must be to a large extent educational. It is impossible for one to see a person making a mistake without having a desire to help him. The farmer must be taught the value of good, clean, virile seed, also the necessity of having his seed tested for germination and purity before seeding. Washington grows more than 50,000 acres of corn annually, yet not five samples of corn are received at the laboratory each year for test, and every one knows the effect on the ultimate crop which a poor germination of seed will entail, for it may cut the crop in half.

The State of Montana annually tests some 10,000 samples, a large proportion of them sent in by the farmers. Minnesota tests approximately the same number, the majority being sent in by farmers. In two years the Washington farmers sent 118 samples to the laboratory at Olympia.

As a part of the educational work, the state seed analyst visits several of the fairs each year. The State Fair at Yakima was attended in September, 1917 and 1918, with an exhibit of seeds, grasses, weeds, etc. The Southwest Washington Fair at Chehalis in 1917 and the Western Washington Fair in Puyallup in 1917 and 1918 were also attended. It is the object of the department through the medium of these exhibits to impress upon the farmer the great necessity of sowing more useful seeds, and less useless weeds. (Weeds not only choke out the cultivated crop, but they absorb plant material and valuable moisture from the already too limited amounts available.)

It is also the aim of this section to give the seed work as wide publicity as possible through the newspapers, fairs, and similar methods. Lack of funds, however, greatly cripple the work. Some farmers in the state appreciate the importance of the seed work, but by far the majority of them have not yet been reached.

SEED IMPROVEMENT.

A bin of grain may be compared to a herd of cattle or a band of sheep. Superior individuals may be selected from each. Individual kernels of grain vary as much in ability to produce good or poor offspring as do individual animals. The heavy plump seeds are produced in the majority of cases upon the strongest and most vigorous plants, and the light shrunken seeds upon the weaker and less vigorous plants.

Improvement can only be brought about by eliminating the poorest and breeding from the strongest individuals. Hence there is just as much reason for selecting good individual seeds of grain as for selecting good individual animals. It will not cost more than 10 cents per bushel to clean and grade grain, and one bushel increase per acre will a good deal more than pay for it; if seed is properly cleaned and graded an increase of from five to ten bushels per acre may confidently be expected. The ultimate result of this work would undoubtedly be "certified seed," something both farmers and seedsmen are vitally interested in. Seedsmen claim they would willingly pay 25 per cent more for certified seed than for the ordinary run of stuff, and it certainly would be a splendid investment for the grower to obtain good, pure, acclimated seed by paying such a small premium. The seed growers of the state are endeavoring to organize themselves so that in a few years they may be producing certified seed on a commercial basis. The State of Idaho expects to appropriate \$5,000.00 to be used by the seed commissioner for seed certification work alone.

SAVING SEED.

It is frequently the case that some sections of a field produce grain of better quality than do other parts. This may be due to some difference in the soil—rust or some other cause. It frequently will pay to harvest such a section by itself and use it for seed. A still better plan is to have a special seed patch and improve on it each year if possible, finding the variety that is most suitable for local conditions, everything considered, and then eliminate the least desirable types of that variety. Grain to be used for seed should be fully matured and allowed to go through the usual sweat in the stack rather than in the bin, and when threshed, should be stored in a dry place where it will not heat. When possible, grain should have a rest after being matured before it is used for seed. Recently matured grain will not germinate so well as grain two or three months old; in some cases new grain will not germinate 20 per cent, while if held for three months, it would germinate 90 per cent.

Corn to be used for seed should be selected in the field before the crop is harvested and stored in a warm, dry place to cure properly. Severe cold is frequently injurious to damp seed, but freezing will not harm seed which is thoroughly dried.

ENEMIES OF WASHINGTON FARM CROPS.

Wheat is the leading crop in the State of Washington, and with present prices, is valued at around \$80,000,000.00 annually. Through smut it is estimated that 10 per cent of the crop is lost. Therefore, do not neglect to treat your seed before sowing, and use the most resistant strains suitable for your neighborhood. Marquis and Turkey Red, the former a red spring and the latter a red winter, have proven themselves most resistant in the Northwest, and both are excellent milling wheats, being used by practically all Northwest millers as the basis for their strong baker's flour. Full information regarding the treatment of seed cereals and potatoes, as well as information regarding the best varieties to be used, may be obtained from the county agents or the State College.

The Hessian Fly.

The dreaded Hessian fly made its appearance in the state this year. It was discovered in the flaxseed stage in a field of wheat near Kent. The discovery was made by the seed analyst of this department in conjunction with Mr. J. C. Eakle of the horticultural division. Steps were immediately taken, and the crop destroyed. Later in the summer the appearance of this same pest was reported at Fisher's Landing, near Vancouver, Clarke County, and Kelso, in Cowlitz County. At Vancouver the outbreak is so serious that the United States Bureau of Entomology recommends the discontinuance of wheat growing as the surest method of control.

The Hessian fly (*mayetiola destructor*) is much the most destructive of any of the insects attacking wheat, to which its injury is practically confined, for though it occasionally appears on barley and rye, it has never been reared on other grains or grasses. Its name was received from the fact that it first appeared on Long Island in 1779 shortly after some Hessian troops had landed there. It now appears in almost every wheat growing section of the world. Not infrequently it destroys from 25 to 50 per cent of the crop, while the average annual loss in the United States is 10 per cent of the crop.

Life History.

The adult flies are little, dark-colored gnats about one-tenth of an inch long; so minute are they that they generally escape observation. Each female lays from 100 to 150 small reddish eggs, placing them in irregular rows of from three to five or more, usually upon the upper surface of the leaves. In a few days these hatch into small reddish maggots which soon turn white, are cylindrical in shape, about twice as long as broad, and have no true head or legs. The fall brood of maggots conceal themselves between the leaf and its base. In the spring they stop at one of the lower joints and absorb the moisture and destroy the tissues. The first indications that the maggot is at work are the tendency of the plant to stool out, the absence of the central stem, and the much darker color of the foliage. Later many plants turn yellow and die.

About three or four weeks after hatching the maggots are full grown and of a greenish-white color. The skin becomes brown and shriveled, and inside is formed the pupa. This is commonly called the flaxseed stage; in this stage most of the fall brood passes the winter, the flies emerging in April or May, while the summer brood passes its flaxseed stage in the stubble during the late summer, emerging when the first wheat is planted in the fall.

Entomologists are of the opinion, however, that we only have one brood on the Pacific Coast, and our observations would tend to corroborate that opinion. The fly when found by us at the beginning of July was already in the flaxseed stage and was still in that condition in September, when the field was destroyed; this long wait was necessitated by the wheat field being surrounded by oats then in a ripening condition. The wheat was sown late in fall and grew well until early summer, when it gradually turned yellow and died, at no time becoming more than six inches in length. In order to destroy as many of the pupae as possible, the field was thoroughly rolled by a hot road roller, then burned and afterwards plowed under deeply. This work was accomplished under the supervision of Messrs. Rhodes and Eakel of the

Seattle horticultural inspection district, and thanks are due to both gentlemen for their assistance in the matter.

There are several species of small chalcis flies parasitic on the larvae and pupae, and were it not for their assistance, it would be a very difficult matter to raise wheat in several sections of the country. Rotation of crop and cultural methods are advised as means of control. Some strains of wheat are more resistant than others, the coarser-strawed—especially the red wheat—varieties generally being better able to withstand the attacks than the slow-growing, weak-strawed varieties.

The Wire Worm.

The wire worm frequently attacks wheat in all sections of the state; it is the larvae of the click bug and is very destructive to any crop which it may attack. It takes four years to reach maturity, three of which are spent in the soil. It may be controlled to some extent by rotation of crop, fall plowing, and destroying all the rubbish and old fence rows which are the haunts of the bug.

Rust.

Almost every year rust attacks wheat in the western section of the state. It may be recognized by the masses of red spores which are to be seen on the glumes and straw. In cold sections of the country the disease will not live over in this stage, but develops a resting stage on the barberry or incense cedar on which the cycle is completed, and the spores disseminated anew to infect another crop. In our mild climate on the Pacific Coast, however, the spores will live over in the uredospore stage and infect the plant direct thereby.

Seed treatment is of very little avail where this disease is concerned; cultural methods, crop rotation, and resistant strains are the main hope.

NOXIOUS WEEDS.

Wild Oats (*Avena fatua*, L.)

In many samples of cereals the seed of wild oats is found. It is an annual, and one of the worst weeds found in cereals, as it is very difficult to separate either by sieves or blowers. Wild oats closely resemble the cultivated varieties and possibly are the source from which our oats came. It may be distinguished by the strong black twisted awn, and the horseshoe scar at the base of the seed which is surrounded by hairs.

The seed may be sown with that of some crop, or carried by threshers, or distributed in manure which has not been well rotted. The crop matures early in July and sheds its seed which grows the following year, and may live in the soil for not to exceed twenty months.

Eradication.

Stop sowing seed grain containing wild oats. On infested land, grow early maturing crops such as fall rye for green manuring or forage. Where wild oats have matured and shattered out disc the land immediately after harvest to encourage germination. The plants thus started to grow may be destroyed by late fall plowing. A crop rotation containing a cultivated crop will greatly facilitate the eradication.

Clover and Alfalfa Dodder (*Cuscuta Epithymum*, Murr.)

This plant is an annual of an entirely parasitic nature. The dodder seeds germinate and soon perish unless they come in contact with a clover or alfalfa plant. Soon after contact is accomplished, the roots die. Thereafter the plant derives its nourishment from the host plant by means of haustoria, or suckers, inserted into the stem. The plant is practically leafless and spreads rapidly by means of long, twining stems which wind themselves around additional plants and soon form a dense matted surface over a considerable area. The flowers are whitish or pinkish, occurring in clusters along the stems. The plant flowers from June until frost and seed may be found from July on. The infected areas may be distinguished by the yellow coloration. The seed is small, greenish-yellow to dark brown in color, oval to spherical in shape, dull, lightly pitted, or granular.

When a clover or alfalfa patch is badly infected, the area should be cut or pulled up, allowed to dry, coal-oiled and burned. The area may be afterwards re-seeded if desired. If only in small spots, simply cutting and allowing to dry, then burning on the spot, will kill dodder if carefully done and before the dodder goes to seed.

Idaho alfalfa is very prone to contain dodder seed, and is always closely watched. In the eastern section of Washington some very fine alfalfa and clover seed may be produced, and many farmers are doing so. There is, however, a certain proportion of growers who are paying no attention to the dodder situation, and as a consequence, seedsmen have lost confidence in the offerings from the entire district. This is especially true of the clover seed produced in the Yakima Valley.

Canada Thistle (*Cirsium arvense*, L.)

Canada thistle is a perennial of European origin. The stems of the plant which are produced by deep running root stalks are smooth, much branched, and vary from one to three feet in height. This plant is dioecious, some plants producing only male flowers while others produce female. It is propagated by seed and root stalks. It yields seeds in July and August; the seeds are smooth, light brown, straight or slightly curved, and flattened. The only effective manner of eradication is to starve out the plant by continual clipping and preventing the manufacture of available plant food. This pest appears to be on the decrease in this state.

Wild Mustard (*Brassica arvensis*).

Wild mustard is well known and very common to grain growers throughout the state. It is an annual producing erect branching stems, which grow from one to three feet in height. It flowers from June to September, and seed is found in August. The seed is borne in pods from one to two inches long and is round, varying in color from reddish-brown to black. The seeds retain their vitality for many years, and a new outbreak will assuredly follow the plowing up of seeds sufficiently near to the surface to cause germination.

Eradication.

Avoid planting seed containing wild mustard. Sow to meadow for a few years where possible, or spray with iron sulphate. Planting in the fall is a very good practical method, and one that in the experience of the writer never

falls to lessen the amount of charlock in the crop on ground infested by this pest.

Seed Control.

Table No. VIII shows the amount of money spent for seed control work by some of the states, also the number of employees necessary to enforce the law and give adequate service to the public. The amount expended by the other ten states having seed legislation is not definitely known, inasmuch as the work is provided for from the general fund, but it is, however, in many states very considerable and in no case appears to be less than \$1,000.00 annually.

Suggestions.

The department wishes to submit the following suggestions as the basis for an amended seed law:

1. Seed exchange bureau, to be conducted by the department to locate good, clean seed, and put the men producing it in touch with seedsmen and other buyers; to publish such a list from time to time if necessary.
2. License all persons selling seed within the state. A nominal license fee and a bond to be furnished will tend to eliminate the irresponsible seed peddlers who are found in every section of the state and to protect the farmer and law-abiding seedsmen.
3. Railroads to refuse all seed not properly labeled and bearing the license number of the shipper.
4. Seed department to have complete jurisdiction over the weed control of the state; may deputize the road supervisors.
5. To make an appropriation to lead in the direction of seed certification and field inspection.
6. Free testing of samples for all citizens of the state, with a reasonable limit to be established which will protect the department from being used exclusively by the larger seedsmen.
7. Section 3067R, paragraph 3, to be amended, making it necessary to have the actual purity and germination test on the label, also date of test.
8. Section 3062R, paragraph 5, to be eliminated entirely.
9. Samples sent in for test to be labeled as follows:
 - (a) Name and address of sender.
 - (b) Name of seed.
 - (c) If grown by sender; if not, from whom purchased.

For much of the information in this report I am deeply grateful to my predecessor, Miss Katherine Stone, who was for four years head of this section, and who so ably laid the foundation on which we hope to build. Her well kept records and valuable accumulation of information were of inestimable value in rendering this report.

Respectfully submitted,

ALEX GILBRAITH.

State Seed Analyst.

TABLE I.

This table shows the number of samples received from each county and the best approximate value of hay and grain products of each county we have been able to secure.

COUNTIES	Place in List	Number of Samples in Two Years	Approximate Value of Farm Crops Exclusive of Wild Grass Hay
Adams.....	16	8	\$12,000,000
Asotin.....		0	3,000,000
Benton.....	13	22	2,500,000
Chelan.....	14	16	1,000,000
Challam.....	20	4	2,000,000
Clarke.....	9	44	1,500,000
Columbia.....	25	1	4,500,000
Cowlitz.....	18	5	500,000
Douglas.....		0	5,000,000
Ferry.....		0	2,500,000
Franklin.....	22	4	3,000,000
Garfield.....	26	1	6,000,000
Grant.....	19	5	5,500,000
Grays Harbor.....	17	6	1,500,000
Island.....	21	4	.....
Jefferson.....		0	.....
King.....	2	139	5,250,000
Kitsap.....		0	.....
Kittitas.....	15	13	3,500,000
Klickitat.....	24	2	3,500,000
Lewis.....	12	35	1,500,000
Lincoln.....		0	19,500,000
Mason.....		0	500,000
Okanogan.....		0	500,000
Pacific.....		0	150,000
Pend Oreille.....		0	450,000
Pierce.....	5	63	.....
San Juan.....		0	.....
Stagit.....	11	36	4,750,000
Skamania.....		0	.....
Snohomish.....	8	52	.....
Spokane.....	3	123	.....
Stevens.....		0	1,750,000
Thurston.....	7	55	1,250,000
Wahkiakum.....	23	3	.....
Walla Walla.....	6	62	11,500,000
Whatcom.....	4	75	3,750,000
Whitman.....	10	42	29,750,000
Yakima.....	1	141	15,250,000
Total.....		962	\$153,350,000

TABLE II—PRODUCTION OF VEGETABLE SEED IN STATE OF WASHINGTON.

PLANT	Acres	Amount Per Acre (Pounds)	Percentage of Total National Production
Onion.....	30	300	.....
Dwarf beans.....	456	300	.....
Garden beans.....	26	350	.....
Garden peas.....	38,467	900	33.3
Turnips, white.....	353	1,200	50
Turnips, Swede.....	227	1,200	80
Mangold, Wurtzel.....	101	1,350	25
Beet (garden).....	121	1,135	5
Pumpkin.....	148	250	10
Summer squash.....	323	325	33.3
Spinach.....	1,767	1,000	50
Cabbage.....	514	550	75
Radish.....	709	750	10

TABLE III.

COUNTIES	Alfalfa	Wheat	Barley	Beans	Cabbage	Clover (Q.)	Clover (R.)	Clover (W.)	Corn	Kale	Wangolds	Oats	Peas	Red Top	Rye	Sweet Clover	Timothy	Tur-nips	Vetch
Clarke.....									100	10		1,000	30		40				60
Cowlitz.....			50						20			500	5						
Franklin.....																			
Grays Harbor.....																			
Jefferson.....																			
Kitsap.....																			
Klickitat.....	50		1,500	50						2		1,500	60		1,000	40		25	
Pierce.....				25						20		265	150		100				
Pacific.....												Very little							
Pend Oreille.....		10					20					350	35		100				
Spokane**.....												40,000							
Thurston.....			300	50					10			6,000	800		1,000			10	25
Total acres reported	50	10	1,850	125	*		20		130	32		9,615	40,580		2,240	40		35	2,065

† Is a wheat county, but in the near future will have about 10,000 acres under irrigated cultivation, and then may produce some seed.

‡ Farmers not interested in this work, but agent suggests mangolds, rutabaga and spinach to be worked in conjunction with dairying.

§ Usually surplus of bluebell and kaiser field peas, but this year crop very short in everything.

** Also possibility for many other varieties of seed which might be pushed.

* Seventy-five per cent of all cabbage seed produced in United States produced in Washington, principally in Skagit county.

TABLE IV—AVERAGE OF PURITY CLOVER AND ALFALFA.

NAME OF CROP	Stand- ard	1914-1915			1915-1916			1916-1917			1917-1918		
		Number of Samples	Per- centage of Purity	Number Above Standard	Number of Samples	Per- centage of Purity	Number Above Standard	Number of Samples	Per- centage of Purity	Number Above Standard	Number of Samples	Per- centage of Purity	Number Above Standard
Alfalfa	86	52	98.923	50	24	98.98	21	23	98.25	27	12	97.78	11
Red clover.....	82	75	97.96	75	21	98.5	19	20	98.02	20	29	90.9	21
Alsike	90	19	95.75	18	8	94.39	6	7	92.64	6	11	98.43	10
White clover.....	90	25	95.87	25	8	97.46	6	10	98.31	8	8	94.94	7
Sweet clover.....	90										2	99.36	2
Totals.....		171		168	61		52	66		61	62		51

TABLE V—AVERAGE PERCENTAGE OF PURITY OF GRAINS, GRASSES AND ROOT CROPS.

NAME OF CROPS	U. S. Seed Stand- ard	1914-1915			1915-1916			1916-1917			1917-1918		
		Number of Samples	Per- centage of Purity	Number Above Standard	Number of Samples	Per- centage of Purity	Number Above Standard	Number of Samples	Per- centage of Purity	Number Above Standard	Number of Samples	Per- centage of Purity	Number Above Standard
Timothy	96	13	97.84	12	18	98.16	16	12	99.09	12	10	97.2	9
Cereals	98	2	97.63	1				2	90.95	0	1	99.66	1
Bluegrass	80	5	89.55	3	2	91.90	2	6	94.37	6	2	93.03	2
Red top.....	90	2	94.93	2				4	87.49	3			
Rye grass.....	95	2	94.93	1	1	98.65	1	5	94.47	4	1	97.27	1
Vetch	98	2	93.93	0	1	98.98	1				1	82.77	0
Orchard grass.....	70	4	83.38	4	2	92.20	2	4	95.01	4	8	89.96	8
Kale	99				2	92.99	0				1		
Best												99.75	1
Total.....		80			26			33			24		
Miscellaneous		8		8	8		8	12		12			
Totals.....		88		31	84		30	45		41	24		22

TABLE VI—GERMINATION TESTS, 1914-1916.

KIND OF SEED	No. of Tests	Standard (U. S.)	Highest Test	Lowest Test	Average Test
Alfalfa (<i>Medicago sativa</i>).....	73	80	97.5	54	87.6
Barley (<i>Hordeum vulgare</i>).....	6	90	100.0	91.5	96.5
Bluegrass (<i>Poa pratensis</i>).....	15	45	83.5	22.0	50.0
Clover, red (<i>Trifolium pratense</i>).....	89	80	97	60.0	81.1
Clover, alsike (<i>Trifolium hybridum</i>).....	34	75	96	77	86.22
Clover, white (<i>Trifolium repens</i>).....	32	75	94	58	81.48
Clover, sweet (<i>Mellilotus alba</i>).....	4	75	76.5	60.5	70.0
Corn, sweet.....	2	75	100.0	76.5	88.25
Millet (<i>Seteria italica</i>).....	2	85	93.5	91.5	92.5
Oats (<i>Avena Sativa</i>).....	4	90	100	64	83.0
Orchard grass (<i>Dactylis glomerata</i>).....	5	70	80.5	64	72.5
Kale	4	90	96.5	30	74.1
Rye grass (<i>Lolium italicum</i>).....	2	80	93	92	92.5
Timothy (<i>Phleum pratense</i>).....	37	85	99	58	90.2
Wheat (<i>Triticum</i>).....	2	90	99.5	99.5	99.5
Red top (<i>Agrostis alba</i>).....	2	70	87.5	11.5	49.5
	313				

TABLE VII—GERMINATION TESTS, 1916-1918.

KIND OF SEED	No. of Tests	Standard (U. S.)	Highest Test	Lowest Test	Average Test
Alfalfa (<i>Medicago sativa</i>).....	47	80	98.5	57.5	84.32
Barley (<i>Hordeum vulgare</i>).....	1	90	80.5	80.5	80.5
Bluegrass (<i>Poa pratensis</i>).....	8	45	80	35.5	65.12
Clover, red (<i>Trifolium pratense</i>).....	37	80	95.0	64.5	82.58
Clover, alsike (<i>Trifolium hybridum</i>).....	12	75	93.5	72.5	82.09
Clover, white (<i>Trifolium repens</i>).....	11	75	82.5	33.5	73.5
Clover, sweet (<i>Mellilotus alba</i>).....	3	75	78	42.5	64.8
Corn, sweet.....	6	96	97	82.0	89.25
Millet (<i>Seteria italica</i>).....	1	85	89.5	89.5	89.5
Oats (<i>Avena Sativa</i>).....	3	90	98.5	58	83.5
Orchard grass (<i>Dactylis glomerata</i>).....	10	70	86.5	67.5	77.85
Red top (<i>Agrostis alba</i>).....	3	70	71.5	52.0	65.0
Meadow fescue (<i>Festuca pratensis</i>).....	1	85	81.5	81.5	81.5
Kale	10	90	99.0	64.5	93.1
Rye grass (<i>Lolium italicum</i>).....	5	80	82.5	63.5	73.2
Timothy (<i>Phleum pratense</i>).....	21	85	98	84	92.5
Wheat (<i>Triticum</i>).....	16	90	99.5	73.0	94.34
	195				

TABLE VIII.

NAME OF WEED	ALFALFA			RED CLOVER			ALSIKE			WHITE CLOVER			TIMOTHY			ORCHARD GRASS			GRASS MIXTURE			CEREALS		
	1914-1916	1916-1918		1914-1916	1916-1918		1914-1916	1916-1918		1914-1916	1916-1918		1914-1916	1916-1918		1914-1916	1916-1918		1914-1916	1916-1918		1914-1916	1916-1918	
Canada thistle.....	.76	0		6.25	6.5		0	0		0	0		6.45	7.3		0	0		0	0		0	0	
Clover and alfalfa dodder...	18.5	31		2.1	12.8		0	0		0	0		0	0		0	0		0	0		0	0	
Corn cockle.....	0	0		0	0		0	0		0	0		0	0		0	8.5		0	0		0	0	
Field dodder.....	0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0	
Quack grass.....	0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0	
Wild mustard.....	0	4.95		0	6.1		0	0		0	0		0	4.8		0	0		0	0		0	0	
Wild oats.....	0	2.4		0	0		0	0		5.5	0		0	4.8		0	0		0	0		0	0	
Black mustard.....	3.96	4.95		5.2	0		0	0		0	0		16.1	4.8		0	0		0	0		100	0	
Bindweed.....	0	0		0	0		0	0		0	0		0	0		0	0		0	0		0	0	
Curled dock.....	20.0	31.0		22.8	38.8		0	0		12.1	22.2		0	13.6		33.3	58.3		0	0		0	0	
Plantain buckhorn.....	33.0	42.8		27.1	45.0		7.4	11.1		12.1	44.4		12.95	9.1		0	16.6		0	0		0	0	
Russian thistle.....	4	5		7.3	7.8		0	0		0	0		0	0		0	0		0	0		0	0	
Sheep sorrel.....	0	42		30.3	38.8		63.0	55		24.2	100		0	46.0		33.3	66.6		0	0		0	0	
Smooth crabgrass.....	0	0		2.3	0		0	0		0	0		0	0		0	0		0	0		0	0	

TABLE IX—SEED CONTROL—STATES WITH DEFINITE APPROPRIATIONS.

STATE	Annual Appropriation	NO. OF PERSONS EMPLOYED
Idaho	\$5,000	(Inadequate; expects \$7,500). Seed commissioner, analyst and assistant; also inspectors in country as funds will allow.
Kentucky	3,500	Chief, and as much assistance as funds will allow.
Maine	23,000	Chief, inspector, analyst, and necessary help. Also assist in other inspection work.
Montana	16,000	Superintendent, assistant, three other assistants, and as much additional help as possible.
Nebraska	1,800	(Salary of analyst). As much help as necessary because work is bound up in the department as a whole.
New Hampshire...	500	
New Jersey.....	7,000	Chief, analyst, assistant, stenographer and laboratory aid. (Expect more; not enough). Seed commissioner, two regular and several part-time assistants.
North Dakota....	6,500	Has federal analyst.
Oregon	1,000	Pays salary of analyst.
Pennsylvania	1,500	(Expects more). Chief analyst, three laboratory assistants.
Virginia	6,500	Analyst.
Washington	1,200	(Entirely inadequate). Chief, assistant, stenographer and laboratory aid.
Wisconsin	5,000	One analyst.
Wyoming	1,200	One analyst and necessary assistants.
Minnesota	6,500	One chief analyst, assistant, two inspectors.
West Virginia....	10,000	

North Carolina and Tennessee also have sufficient funds to carry on the work, but such funds are not segregated and are also helped by licenses. The other ten states receive small funds from the funds of either the dairy and food commission or department of agriculture.

REPORT ON FOODS, FEEDS, FERTILIZERS, DRUGS, OILS, BAKERY AND RESTAURANT INSPECTIONS.

Hon. E. F. Benson,
Commissioner of Agriculture,
Olympia, Washington.

Dear Sir: In compliance with the law, I am submitting herewith the Third Biennial Report of the Fourth Division of the State Department of Agriculture, covering the period from July 1, 1916, to June 30, 1918. The work includes foods, feeds, fertilizers, drugs, oils, bakery and restaurant inspections.

The Hon. J. J. Higgins of Seattle was chief of this division from July 2, 1913, to August 3, 1917, when, after a serious illness, he departed this life. After his demise I was appointed to succeed him as chief of the division, since which time I have endeavored to administer the affairs of the division in an economical and efficient manner and in accordance with the policy of the state administration, viz., to accomplish as much work as possible with the least expense.

The activities of this division during the past biennium have been greatly increased over those of the previous period. This is due, in a great measure, to our country being at war. The Federal Government, in its desire to conserve and save for our boys and allies, has permitted (with restrictions) substitutes and by-products to be used in the manufacture of foods. Some of the manufacturers have taken advantage of this leniency and utilized mill offal, refuse and rubbish for the same purpose. Until the past year the adulteration, misbranding and fraud in the manufacture and sale of food products has been on the increase, which has multiplied our work and made us more active, watchful and vigilant.

Seattle being the largest manufacturing and distributing point of food products in the state and the state office having been permanently located here since January, 1917, has given the whole force of the fourth division opportunity to be alert and on the lookout for the large shipments of illegal and unfit food products that are distributed from here. We get them in bulk before they are sent broadcast throughout the state, thereby saving traveling, hotel and other expenses while hunting them up.

During the period covered in this report there were employed in food, feed, fertilizer, bakery and restaurant inspection work two inspectors all of the time and three part of the time, in addition to myself, and one drug inspector all of the time. The duties of the food inspectors and the drug inspector called them practically to all the large cities and towns of the state and, through the use of our Ford machine, inspections were made at many of the smaller towns and out-of-the-way places; work that could not have been accomplished, except at heavy expense, without the Ford auto.

They covered the inspection of foods and drugs at the manufacturing plants, factories, wholesale and retail food and drug establishments, as well as bakeries, restaurants, hotels, boarding houses and doctors' offices. Inspections have been made of cold storage and packing plants, slaughter and commission houses, grocery stores and meat markets, feed and flouring mills and stores, bottling works and soda fountains, drug stores, butter stores, bakeries.

restaurants and all places where food and drug products are manufactured, stored or offered for sale.

The total number of inspections made by the fourth division during the biennium was 25,788, subdivided as follows: Cold storage plants, 64; packing plants, 11; manufacturing plants, 102; wholesale houses, 219; commission houses, 163; grocery stores, 5,119; meat markets, 3,516; bottling works, 53; soft drink places, 1,564; drug stores, 2,107; butter stores, 1,728; bakeries, 1,008; restaurants, 775; barber shops, 4; confectioneries, 99; creameries, 3; doctors' offices, 44; fruit and vegetable stands, 2,486; fish markets, 480; fertilizer plants, 10; feed mills, 216; feed stores, 439; general stores, 144; hotels and boarding houses, 25; hospitals and sanitariums, 50; oils, 273; public market stalls, 3,743; piers, 203; fruit stands, 493; seed stores, 32; slaughter houses, 69; miscellaneous, 304; reinspections, 186, and assistant inspections, 33.

The foregoing inspections resulted in 65,798 packages of foods and drugs, 88,432 pounds of bulk goods, 2,730 dozen of eggs and 100 miscellaneous items—consisting of 10 gallons of cream, 1 barrel bulk olives, and 89 old and insanitary cooking and baking utensils—being condemned, because of being unfit for human food, and the utensils unfit for use in preparing foods for consumption. When possible the above condemned goods were used for animal food; when not, they were utilized in the manufacture of fertilizers. The utensils were destroyed.

In comparing the inspections and destructions of this with the previous biennium you will note that during this period there were 9,184 more inspections made, 24,303 less packages, 197,825 less pounds of bulk goods, and 12,623 less dozen of eggs destroyed; which is evidence of greater activity on the part of the division and that the inspection force has at all times been on the job.

Reports of these different inspections are on file in the Seattle office.

There were also gathered and submitted for analysis to the state chemist 819 samples of foods and drugs, 124 samples of stock and poultry feeds suspected of being in violation of the pure food and drug law, and 142 samples of fertilizers for analysis. General food and drug samples have not been taken for several years past, owing to the lack of appropriation for the purpose. They should be taken at least once annually, that the department might know they are being held to the standard; besides, it would have a tendency to make the manufacturer more careful.

In addition to our regular inspection work we have conducted an educational exhibit and campaign covering a period of four weeks at four fairs.

CHANGES IN FORCE.

As state food inspector the first fourteen months and as chief of the fourth division the last ten months of this biennium, I have made 6,290 inspections, including 11 slaughter houses, which resulted in closing 1 slaughter house permanently, 3 temporarily closed, 3 notified to improve conditions, and 4 passed inspection; besides making 21 prosecutions for violations of the food laws, resulting in 21 convictions.

The present state food inspector, who succeeded me as such on September 1, 1917, in the last ten months of the biennium has made 3,568 inspections, including 40 slaughter houses, resulting in 10 being temporarily closed,

6 permanently closed, 12 notified to improve conditions, and 12 passed inspection; besides making 43 prosecutions for violation of the state food law, resulting in 1 dismissal and 42 convictions.

From the beginning of this biennium to November 1, 1917, when he severed his connection with the department, the assistant oil and food inspector at Spokane had made 1,113 oil and general food inspections, including 18 slaughter houses, resulting in 2 being permanently closed, 4 temporarily closed, 5 notified to improve conditions, and 7 passed inspection.

BAKERIES.

During this period there were 1,008 bakeries and 775 restaurants carefully inspected. These inspections covered conditions and quality of material used, cleanliness and health of employees, sanitary conditions of buildings, utensils, walls, floors, sinks, etc.

The state bakery and restaurant inspector has worked in conjunction with the food, drug, stock-feed inspectors and myself, and made, including general food, a total of 9,255 inspections of butter stores, meat and public markets, stalls and stands; besides during the biennium has made 50 prosecutions of violators of the pure food laws, resulting in 2 acquittals, 1 dismissal, and 47 convictions.

EGGS.

This state has a law classifying and regulating the labeling and marketing of eggs, which helps somewhat, but we still have complaints about bad eggs. Several years ago the Federal Government claimed that 17 per cent of the egg production of the United States found its way to the dump. I understand, however, this percentage has been decreased somewhat. With careful handling and shipping I believe it can be reduced to a minimum.

A produce merchant of this city told me a few days since that he received a case of eggs from a shipper and found the whole top layer putrid. He notified the shipper, and the eggs were held subject to his order. Subsequently they were turned over to another produce house, where I found them. I had this case of eggs candled, after which two-thirds of the case were sent to the dump; the remainder were only fair cooking eggs, and were sold for that purpose. It is doubtful that the shipper received shipping charges, etc., out of the deal.

To save the egg producer this loss, to save trouble for the produce merchant, and to assure the consumer good eggs, I would suggest the egg law be amended so as to compel those handling eggs to candle them before transferring them to the next merchant, beginning with the producer, as candling is the most accurate way of detecting a faulty egg.

VINEGAR.

During this period we have had very little trouble with the enforcement of the regulations relating to vinegar, as chapter 168, Session Laws 1917, known as substitute Senate Bill 90, compels the Commissioner of Agriculture of this state, with the approval of the Agricultural Advisory Board, to adopt, publish, and enforce as the standards of this state the standards of quality, purity and strength adopted and applied by the United States Department of Agriculture in enforcement of the laws of the United States against the

adulteration and misbranding of foods and drugs, except in cases where other standards are specifically prescribed by the laws of this state.

Prior to the enactment of the above law the state regulation relating to vinegar was in conflict with the federal ruling on the same matter, because the state regulations for cider vinegar called for 4½ grams acetic acid strength, while the federal ruling for cider vinegar called for 4 grams acetic acid. The difference of a half gram between the federal and state rulings caused quite a little dissatisfaction among the vinegar manufacturers of the state, when they knew they were permitted to ship vinegar interstate containing only 4 grams and for intrastate purposes they were compelled to make the product a half gram stronger. Now that the state and the federal rulings are the same there seems to be no dissatisfaction or complaint and the vinegar matter is running smoothly.

VEAL.

For several years past, since the milk condensers have been paying the higher prices to the dairy farmer for whole milk, the farmer has claimed he could only feed a calf at a loss. To prevent this loss he has therefore sold the veal calves to the so-called calf buyer, who, with his auto truck goes from one dairy farm to the other, gathering up these two and three days old calves, and, I understand, sometimes contracts for them before they are dropped at a very small price. They are taken to rural slaughter houses, barns, and sometimes in the timber, slaughtered and placed on the market for veal. This product was seized, condemned and destroyed when falling into the hands of our inspectors, but no arrests were made until chapter 168, Sessions Laws 1917, known as substitute Senate Bill 90 was passed, making it obligatory on the State Commissioner of Agriculture to adopt, publish and enforce section 21, paragraph 1 of the regulation governing meat inspection of the United States Department of Agriculture, which reads: "Carcasses of calves, pigs, kids, and lambs too immature to produce wholesome meat shall be condemned. Such carcasses shall be considered too immature to produce wholesome meat if (a) the meat has the appearance of being water-soaked, is loose, flabby, tears easily, and can be perforated with the fingers, or (b) its color is grayish red, or (c) good muscular development as a whole is lacking, especially noticeable on the upper shank of the leg," etc.

After warning the people trafficking in this unwholesome product for several years, last spring, under the above regulations, we rounded them up and since February, 1918, to the present date we have made 25 prosecutions for violation of this regulation, resulting in 1 dismissal and 24 convictions. We are now getting more wholesome veal.

SLAUGHTER HOUSES.

During the biennium there were 69 rural slaughter houses inspected, with the following results: Temporarily closed, 17; permanently closed, 9; notified to improve conditions, 20; passed inspection, 23; 17 were temporarily closed because the insanitary conditions surrounding the slaughtering made the meat product a menace to public health and they were closed until these conditions were remedied; 9 were permanently closed because the location was absolutely unfit for the purpose; 20 were given notices to improve condi-

tions, such as batten and screen houses to exclude flies, fix drainage, clean killing bed and walls surrounding same; also to whitewash interior of house; 23 passed inspection.

Many of the rural slaughter houses have been fearfully insanitary, but through the passage of substitute Senate Bill 90 by the 1917 session of the legislature, compelling this department to adopt, publish, and enforce the rules and regulations as adopted and applied by the United States Department of Agriculture, we have been able to remedy many of the existing filthy conditions. While it is almost an impossibility to make the rural slaughter house operators comply to the letter of the United States rules and regulations, we are getting to it as nearly as possible, and the country slaughter houses are in a more sanitary condition than ever before.

COLD STORAGE.

There is urgent need of regulation of cold storage. During the biennium large quantities of food products have gone from the cold storage to the fertilizer plants because of there being no time limit for cold storage products. During August of this year we sent from a cold storage plant in Seattle approximately 5,000 pounds of fish which should have been used as a food product instead of being held until it became rusty, putrid, and only fit for fertilizing purposes. This is only one of many instances that occur during a biennium.

We have now in course of preparation a bill covering the matter of cold storage and earnestly hope for its consideration and adoption that this waste of food products may be remedied.

SANITATION.

Notwithstanding the lack of a general sanitary law has placed the inspection force of this division at a great disadvantage, through judgment and diplomacy we have accomplished a great deal of good work along sanitation lines, such as having toilets removed from rooms where food products are manufactured and stored and the cleaning up of back rooms connected with grocery stores and meat markets, where stale vegetables are frequently left to decay and the sawdust from the meat market floor is left for days until the scraps of meat mixed with it become sour and sometimes putrid. But should the inspector be called at any time he would be found with nothing to back him.

I therefore suggest the enactment of a sanitary law similar to that of the State of Iowa, the enforcement of which can be conducted by the inspectors without an increase of expense.

STOCK FEEDS.

This law having been placed under this division for enactment, I, as state food inspector, had gathered all stock and poultry feed samples and submitted them to the state chemist for analysis, until June 20, 1917, when there was an inspector appointed for this purpose; since which time, until the end of this period, there were 124 stock and poultry feed samples taken and submitted to the state chemist for analysis, resulting in 85 being legal, 27 illegal, and 12 doubtful.

Under section 6023 of the State Stock Feed Law there were 11 complaints filed for violation of the law in King, Whatcom, and Spokane counties, resulting in 3 convictions, 1 dismissal, 2 suspended judgments, and 5 cases pending.

The stock feed inspector beside the above work has made 1,179 inspections, including bakery and general foods, and has attended 9 county fairs for educational purposes on stock and poultry feeds.

FERTILIZERS.

During the biennium there were gathered and submitted to the state chemist for analysis 142 samples of fertilizers, the fees collected for the same amounting to \$1,122.00.

The law authorizes the publication of the results of the analysis made. The 1917 session of the legislature failing to provide the necessary printing fund is why such publications have not been made.

The fertilizer law should be so amended as to provide a standard, or the necessary funds should be appropriated for the purpose of publishing the results of these analyses, because, prior to the war, when potash was plenty and low in price, some of the manufacturers used the word "complete" on some of their brands, and gave as their guaranteed analysis—Nitrogen, Phosphoric Acid and Potash. The past season potash was virtually off the market, and it was impossible to procure it, and still some of the manufacturers persisted in branding a fertilizer "complete" when it contained only nitrogen and phosphoric acid. If it was complete with potash it is incomplete without it, and the results of the analysis should be published as per the law, that the farmers may be advised of this and other facts.

DRUGS.

The drug inspector during this period has made 4,365 inspections, consisting of wholesale and retail drug establishments, hospitals, sanitariums, doctors' offices, bottling works and soda fountains and general food establishments. His personal report will be found with the division reports.

OIL.

The report of the chief oil inspector will be found in connection with the division reports, with his comments.

PROSECUTIONS.

One hundred and nineteen prosecutions for violation of the food and drug laws were made by this division during the biennium, which resulted in 107 convictions, 5 dismissals, 2 forfeitures of bonds, 2 suspended judgments, 2 acquittals, and 1 ordered to discontinue basement bakery, but was not fined. Besides the above, 7 cases are now pending. The fines and forfeitures aggregate \$3,770.00. The above prosecutions were made in 21 counties.

INSPECTORS.

I attribute much of the success of this division to the fact that we have not been hampered by being compelled to take into the service men who are not qualified for their positions by training.

The scientific nature and commercial importance of the several lines of work pursued by us make it necessary that none but those trained in their

respective lines be employed, as in any other business enterprise we could not expect men schooled in another line of work to make good. To be of service to the public the inspectors enforcing the food, feed, fertilizer, drugs, bakery, and restaurant laws must be familiar with commercial channels through which foodstuffs are marketed; must be conversant on the subject of proper methods of handling and storing foods; and must possess sufficient training in sanitary science to secure a practical application of the several laws.

As a matter of fact, it is difficult for the department to secure and retain the services of men who are competent to do the work in the various fields pursued by us. The experience gained by our inspectors qualifies them in a few years for positions at an advance in salary and the state is compelled to compete with the Federal Government, other states and cities and commercial concerns for their services.

Our salary limits have remained substantially the same as those in force eight years ago, regardless of the fact that the cost of all of the necessities of life have risen at least 100 per cent. Our people are all trained and giving efficient service. Unless the salary limits affecting the inspectors, stenographers and clerks of this division are substantially increased I feel that we will be unable to maintain the present efficient service.

DIVISION BULLETIN.

During the biennium we have issued no bulletins as required by the food and fertilizer law because of the lack of sufficient printing fund.

The detailed inspection reports are on file in the department and can be consulted by the public at any time.

Respectfully submitted,

WILL H. ADAMS,

Asst. Commissioner, in Charge Division Foods, Feeds, Etc.

REPORT OF STATE DRUG INSPECTOR.

In making a report of work done and results accomplished during the past biennium I find that many conditions of affairs have arisen which have delayed trips and in many cases made complete change of routing necessary.

Due to the present unsettled conditions, manufacturers have been compelled to change formulae, and many to discontinue the manufacture of one, and sometimes many or all, of their preparations, as the materials entering into the composition of such preparations were either produced, manufactured or grown in one of the warring countries.

This has made our work harder, and necessitated greater vigilance; as some manufacturers, not being equipped to test ingredients, would buy from those whose price was the lowest, without regard to the quality of the drug itself, resulting in a mixture the composition of which was unknown, or the results to be obtained from the uses of it greatly misstated.

On the other hand, those manufacturers who always had standardized doubled their vigilance, and the dealers who handled their preparations were able to continue the quality of their own products, though at an increased price.

Many unscrupulous persons have taken advantage of the shortage of chemicals to foist upon the trade imitations of these at prices enough below the quoted price of the true article to act as a bait to the unsuspecting purchaser. By obtaining the co-operation of the dealers, who before buying would request that these products comply with the laws and regulations, we have been able to detect and regulate such dishonest practices.

The shortage of sugar has caused considerable trouble, but the loyalty of manufacturers has come to the front with an earnest endeavor to produce substitutes requiring lesser amounts or new ones made from pure ingredients heretofore unthought of for such uses.

There had been many complaints of foreign (poisonous or harmful) ingredients having been added to candy and other foods sold at places frequented by soldiers, but most of these upon investigation (samples having been taken and submitted to the state chemist for analysis) have proved to be without foundation. But we could not relax our vigilance, and thus considerable time and money was spent to carry on these investigations which, in other less serious times would be spent in looking after quality, cleanliness and proper labeling throughout the state.

As the greater quantity of goods for our state are unloaded at coast points, and the greater congestions of people doing war work have been on Puget Sound, it has required more of our time at Seattle, Tacoma, and other coast points. But we have covered all the state at least once each year and answered each call made upon us as soon as we could complete what we had in hand and hurry to that point.

We have been hampered very greatly in the purchase of samples by the shortage of money and through the lack of help given the two state chemists, who do our work without pay, and as soon as they get an assistant broken in see him taken away by some other school which is more liberal with salaries.

We have compelled the bottlers of soft drinks to adopt standards and label their products correctly, and today they are producing most of their goods from the fruit or fruit juices themselves, instead of synthetic ethers as formerly. We have compelled greater cleanliness around soda fountains and require glasses and utensils to be washed in hot water, and when such hot water is not available, have urged the use of sanitary paper cups, etc.

We are also greatly hampered by lack of transportation facilities, and believe it to be to the best interest of the state that each inspector be supplied with an automobile, that each may finish his work in one place and hurry on to the next without waiting upon some other inspector whose work may take twice as long to do properly, or cause that person to do only a portion of his work in order to not hold up others traveling with him in the same automobile.

Respectfully submitted,

EDWARD L. JONES,
State Drug Inspector.

SUMMARY OF INSPECTIONS MADE BY THE STATE DEPARTMENT OF AGRICULTURE, DIVISION OF FOODS, FEEDS, ETC.

INSPECTIONS MADE	INSPECTORS							Totals
	Adams.....	Conn.....	Collier.....	Fowler.....	Gray.....	Henderson.....	Jones.....	
Assistant inspections.....	2		3	4			24	33
Bakeries (including notices).....	8	733	6		106	139	16	1,008
Barber shops.....							4	4
Bottling works.....							53	53
Butter stores.....	403	837	8		33	447		1,728
Confectioneries.....	11	32			43		13	99
Cold storage.....	34	1	12		2	13	2	64
Commission houses.....						163		163
Creameries.....						3		3
Doctors' offices.....							44	44
Drug stores.....							2,107	2,107
Fruit and vegetable stalls.....	826	1,172	9		22	457		2,496
Fish markets.....	273	64	70		20	52	1	480
Fertilizer plants.....	2		7			1		10
Feed mills.....			216					216
Feed stores.....	3		424				12	439
General stores.....			5				139	144
Groceries.....	2,653	949	144	1	306	1,026	40	5,119
Hotels and boarding houses.....	1	23					1	25
Hospitals and sanitariums.....		4					46	50
Meat markets.....	1,634	514	132		279	950	7	3,516
Manufacturing plants.....	27	8	49			13	5	102
Miscellaneous.....	127	5	10		81	21	60	304
Oil.....				32	84		157	273
Packing plants.....			10				1	11
Public market stalls.....		3,688	19		4		32	3,743
Piers.....	125		8			70		203
Reinspections.....		186						186
Restaurants.....	68	647			34	16	10	775
Stands.....	20	372				101		493
Seed stores.....			32					32
Soft drink stands.....		0					1,564	1,564
Storage plants and warehouse.....						6	3	9
Wholesale drug stores.....							13	13
Wholesale houses.....	62		15		81	50	11	219
Slaughter houses.....	11				18	40		69
	6,290	9,235	1,179	37	1,113	3,568	4,365	25,787

BAKERY INSPECTION.

Bakeries inspected—		Bakeries
Graded as good.....	302	
Graded as fair.....	130	
Graded as poor.....	38	
Not baking.....	6	
	476	476
Reinspections.....	186	
Total inspections.....	662	
Notices served.....	177	
U. S. reports.....	80	
Bakeries having certificates.....	279	
Bakeries without certificates, as shops do not meet requirements.....	191	
Bakeries not baking.....	6	476

Number of towns visited on inspection trips..... 75

Towns visited and number inspections made—

Aberdeen	13
Auburn	3
Bellingham	6
Black Diamond	2
Blaine	1
Bremerton	8
Buckley	5
Burlington	1
Burton	1
Camas	1
Carbonado	1
Carson	1
Cashmere	1
Centralia	3
Chehalis	2
Clear Lake	1
Cle Elum	3
Colfax	2
Davenport	1
Edmonds	1
Ellensburg	4
Elma	2
Enumclaw	2
Ephrata	1
Everett	13
Everson	1
Fairfax	2
Ferndale	1
Garfield	1
Georgetown	3
Goldendale	1
Harrington	1
Hillyard	1
Hoquiam	12
Kapowsin	1
Kent	1
La Conner	1
Leavenworth	2
Lyle	1
Lynden	1
McCleary	1
Montesano	2
Mt. Vernon	2
Neah Bay	1
Oakesdale	2
Olympia	8
Orting	2
Port Angeles	11
Port Townsend	5
Pullman	3
Puyallup	4
Renton	4
Riverside	1
Rosalia	1
Roslyn	2
Seattle	114
Sedro Woolley	2
Sequim	1
Spangle	1
Spokane	55
South Bellingham	2
Stellacoom	1
Sumas	1
Sumner	3
Tacoma	98
Tekoa	2
Toppenish	2
Vancouver	5
Walla Walla	6
Wapato	2
Washougal	1
Wenatchee	2
White Salmon	1
Wilkeson	4
Yakima	13

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**SUMMARY OF CONDEMNATIONS MADE BY THE STATE DEPARTMENT
OF AGRICULTURE, DIVISION OF FOODS, FEEDS, ETC.**

FOODS.

Canned Goods.

	<i>Cans</i>	<i>Totals</i>
Fish—Miscellaneous	2,597	
Fish—Salmon	55,235	57,832
Fruits		2,758
Marshmallows		8
Meats		274
Milk		616
Miscellaneous		160
Oysters and clams		7
Pork and beans		1
Soups		34
Vegetables	1,004	62,694

Bottled Goods.

	<i>Bottles</i>	
Capers	72	
Catsup	2	
Chill	2	
Dressing	73	
Extracts	332	
Fountain fruits	11	
Horseradish	38	
Jams and jellies	33	
Miscellaneous	210	
Nectar	1	
Olives	281	
Pickles	869	
Pimento	8	
Peanut butter	4	
Relish	18	
Sauces (Worcestershire, etc.)	63	2,019

Package Goods.

	<i>Packages</i>	
Baking powder	58	
Cereal products	112	
Cheese	386	
Fruit—dried	78	
Spices	188	
Vegetables—dried	13	835

Bulk Goods.

	<i>Pounds</i>	
Cereals	70	
Fish	60,986	
Flour	341	
Fruits	4,628 ¹ / ₂	
Meats	5,016 ¹ / ₂	
Nuts	273	
Poultry	1,772	
Vegetables	15,350	88,432

Eggs.

	<i>Dozen</i>	
Eggs	2,730	2,730

Miscellaneous.

Olives	<i>Bbls.</i>	1	
Cream	<i>Gals.</i>	10	
Utensils—cooking and baking	<i>Pcs.</i>	89	100

Drugs.

	Packages
Blood remedies	4
Catarrh cures	14
Children and worm remedies	7
Cold and grippe cures	19
Colic cures	75
Corn remedies	2
Cough cures	8
Fever remedies	16
Fluid extracts	6
Kidney and liver remedies	7
Laxatives	14
Miscellaneous	40
Salves and ointments	1
Syrups	7
Pharmaceuticals	16
Rheumatic remedies	14
	250

157,060 parcels

Summary.

Canned goods	62,694
Bottled goods	2,019
Package goods	835
Bulk goods	88,432
Eggs	2,730
Miscellaneous	100

156,810

Drugs 250

Total condemnations

157,060 parcels

SUMMARY OF PROSECUTIONS MADE BY THE STATE DEPARTMENT OF AGRICULTURE, DIVISION OF FOODS, FEEDS, ETC.

Benton County.

- No. 145—State of Washington v. J. P. Connolly. Charge: Selling decomposed salmon. Fined \$75 and costs.

Chelan County.

- No. 290—State of Washington v. Jim Sing. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.
 No. 291—State of Washington v. Broeking & Mosher. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.
 No.—State of Washington v. Frank Yama. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.
 No.—State of Washington v. S. Ness. Charge: Possession of filthy flour. Fined \$25 and costs.

Clallam County.

- No. 237—State of Washington v. Farmers' Market. Charge: Adulterating Ham-burger with Freez-em. Fined \$25 and costs.
 No. 238—State of Washington v. G. Ellinger. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.
 No. 239—State of Washington v. Cook & Johnson. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.

Clarke County.

- No. 2249—State of Washington v. I. Sutherland. Charge: Possession filthy flour. Fined \$25 and costs.
 No. 2589—State of Washington v. Fullenweider & Son. Charge: Adulterating Ham-burger with Freez-em. Fined \$25 and costs.
 No. 2590—State of Washington v. Fullenweider & Son. Charge: Adulterating Ham-burger with Freez-em. Fined \$25 and costs.
 No. 2588—State of Washington v. W. Carmichael. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.
 No. 2587—State of Washington v. A. Collins. Charge: Selling sub-standard canned milk. Fined \$25 and costs.

Cowlitz County.

- No.—State of Washington v. C. A. Paully. Charge: Adulterating Hamburger with Freez-em. Fined \$20 and costs.

Grays Harbor County.

- No. 347—State of Washington v. Renderich & Raboosch. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.
 No. 349—State of Washington v. C. Julius. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.
 No. 354—State of Washington v. Jim Marzous. Charge: Possession of filthy flour. Fined \$25 and costs.
 No. 353—State of Washington v. N. M. Randish. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.

King County.

- No.—State of Washington v. Seattle & Puget Sound Packing Company. Charge: Selling decomposed salmon. Fined \$100 and costs.
 No.—State of Washington v. Monroe Lewis, president, S. & P. S. P. Co. Charge: Selling decomposed salmon. Fined \$100 and costs.
 No.—State of Washington v. Sigmund Lewis, vice-president, S. & P. S. P. Co. Charge: Selling decomposed salmon. Fined \$50 and costs.
 No.—State of Washington v. J. P. Connolly, traveling salesman, S. & P. S. P. Co. Charge: Selling decomposed salmon. Fined \$50 and costs.
 No. 6978—State of Washington v. John Fischer. Charge: Selling immature, unwholesome veal. Fined \$50 and costs.
 No. 6557—State of Washington v. Tony Pappas. Charge: Operating basement bakery. Ordered to discontinue.
 No. 6896—State of Washington v. Sand L. Brown. Charge: Possession tainted and immature veal. Fined \$50 and costs.
 No. 6979—State of Washington v. A. Otts. Charge: Possession immature and unwholesome veal. Fined \$40 and costs.
 No. 7142—State of Washington v. C. H. Bruce. Charge: Selling immature veal. Fined \$40 and costs.
 No.—State of Washington v. S. L. Brown. Charge: Selling immature veal. Fined \$100 and costs.
 No. 7344—State of Washington v. Ed Nishio. Charge: Possession filthy flour. Fined \$25 and costs.
 No. 7343—State of Washington v. C. Osawa. Charge: Possession filthy flour. Fined \$25 and costs.
 No. 7342—State of Washington v. Anthos Grigoris. Charge: Refilling Lea & Perrin's bottles. Forfeited bond, \$5.
 No. 7343—State of Washington v. Anthos Grigoris. Charge: Refilling Lea & Perrin's bottles. Forfeited bond, \$5.
 No.—State of Washington v. C. C. Frederickson. Charge: Selling immature veal. Fined \$25 and costs.
 No.—State of Washington v. Frank Umchlimski. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.
 No. 7573—State of Washington v. Peter J. Hessler. Charge: Selling immature veal. Fined \$50 and costs.
 No. 7101—State of Washington v. Lehmann Brothers. Charge: Adulterating stock feeds. Dismissed.
 No. 7719—State of Washington v. George Pfeiffer. Charge: Selling immature veal. Fined \$25 and costs.

Lewis County.

- No. 272—State of Washington v. I. A. Muzzleworth. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.

Lincoln County.

- No. 233—State of Washington v. Odessa Meat Co. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.
 No.—State of Washington v. F. J. Field. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.

Jefferson County.

- No. 147—State of Washington v. F. L. Terry. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.

Pierce County.

- No. 5349—State of Washington v. G. Ononyo. Charge: Possession of filthy flour. Fined \$25 and costs.
- No. 5348—State of Washington v. T. Tayuchi. Charge: Possession of filthy flour. Fined \$25 and costs.
- No. 5395—State of Washington v. E. G. Havel. Charge: Refilling Lea & Perrin's sauce bottles. Fined \$25 and costs.
- No. 5394—State of Washington v. I. Olino. Charge: Refilling Lea & Perrin's sauce bottles. Acquitted.
- No. 11546—State of Washington v. E. A. Feddersen. Charge: Selling Oleomargarine without exhibiting sign. Fined \$25 and costs.
- No. 11547—State of Washington v. Beck Bros. Charge: Maintaining filthy restaurant. Fined \$50 and costs.
- No. 11548—State of Washington v. William Nicholas. Charge: Selling wormy walnuts. Fined \$25 and costs.
- No. 11549—State of Washington v. R. Wakimoto. Charge: Possession of filthy bread. Fined \$25 and costs.
- No. 11550—State of Washington v. G. Nouys. Charge: Possession of filthy oatmeal. Fined \$25 and costs.
- No. 11552—State of Washington v. Fred Sneeberger. Charge: Selling Oleomargarine without exhibiting sign. Acquitted.
- No. 11557—State of Washington v. Tony Bazich. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.
- No. 11951—State of Washington v. Fred Sneeberger. Charge: Using Oleomargarine without displaying sign. Dismissed.
- No.—State of Washington v. B. C. Rosser. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.

Skagit County.

- No. 222—State of Washington v. C. C. Woolen. Charge: Possession of veal unfit for food. Fined \$25 and costs.
- No. 223—State of Washington v. Arnid Olsen. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 224—State of Washington v. Mert McKee. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 225—State of Washington v. Mert McKee. Charge: Offering for sale veal unfit for food. Dismissed.
- No. 226—State of Washington v. B. S. Reiki. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 227—State of Washington v. R. W. Isbill. Charge: Selling veal unfit for food. Fined \$25 and costs.
- No. 228—State of Washington v. W. E. White. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 229—State of Washington v. Joe Cann. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 237—State of Washington v. L. M. Morgan. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 238—State of Washington v. J. O'Brien. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 239—State of Washington v. P. C. Dybbro. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 230—State of Washington v. B. H. Crisp. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 231—State of Washington v. E. L. Stevens. Charge: Offering for sale veal unfit for food. Dismissed.

Snohomish County.

- No. 2907—State of Washington v. Seattle & Puget Sound Packing Company. Charge: Selling decomposed and putrid canned salmon. Fined \$100 and costs.
- No. 2908—State of Washington v. Sigmund Lewis, vice-president, S. & P. S. P. Co. Charge: Selling decomposed and putrid canned salmon. Fined \$500 and costs.
- No. 2928—State of Washington v. J. Rygg. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 2929—State of Washington v. Isaac Rygg. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 2984—State of Washington v. I. A. Rygg. Charge: Adulterating Hamburger with Freez-em. Fined \$40 and costs.
- No. 2979—State of Washington v. M. L. Brown. Charge: Selling immature veal. Fined \$25 and costs.

Spokane County.

- No.—State of Washington v. W. S. Gilfre. Charge: Selling adulterated sausage. Fined \$25 and costs.
- No. 6211—State of Washington v. S. Lewis (King County). Charge: Selling decomposed salmon—Spokane County. Fined \$50 and costs.
- No. 6212—State of Washington v. J. P. Connolly of King County. Charge: Selling decomposed salmon—Spokane County. Fined \$50 and costs.
- No. 6213—State of Washington v. J. P. Connolly of King County. Charge: Selling decomposed salmon—Spokane County. Fined \$50 and costs.
- No. 1999—State of Washington v. Muzzy & Van Hersett. Charge: Possession filthy flour. Fined \$10 and costs.
- No. 2001—State of Washington v. E. G. McWilliams. Charge: Possession filthy flour. Fined \$10 and costs.
- No. 2002—State of Washington v. Sam Petre. Charge: Possession filthy flour. Fined \$25 and costs.
- No. 2003—State of Washington v. B. Brunell. Charge: Possession filthy flour. Fined \$10 and costs.
- No. 2010—State of Washington v. Spokane Seed Company. Charge: Adulteration poultry feed. Dismissed with costs.
- No. 2011—State of Washington v. Spokane Seed Company. Charge: Adulteration poultry feed. Fined \$25 and costs.
- No. 2012—State of Washington v. Inland Seed Company. Charge: Adulteration Poultry feed. Fined \$25 and costs.
- No. 2013—State of Washington v. J. W. Walsh. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.
- No. 2000—State of Washington v. Spokane Hotel Company. Charge: Possession filthy flour. Fined \$10 and costs.

Stevens County.

- No.—State of Washington v. John Furst. Charge: Selling diseased carcass of beef. Fined \$25 and costs.
- No.—State of Washington v. Arnold & Todd. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.

Thurston County.

- No.—State of Washington v. Wm. Kost. Charge: Possession filthy flour. Fined \$25 and costs.
- No. 525—State of Washington v. Bolster & Barnes. Charge: Possession filthy flour. Fined \$25 and costs.
- No. 524—State of Washington v. M. Koff. Charge: Possession of filthy flour. Fined \$25 and costs.
- No. 525—State of Washington v. Louis Dorrnecker. Charge: Possession filthy flour. Fined \$25 and costs.

Walla Walla County.

- No. 1765—State of Washington v. Lee Gee. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.
- No. 1773—State of Washington v. Chas. Tung. Charge: Filth in restaurant. Fined \$25 and costs.
- No. 1776—State of Washington v. B. Y. Cain. Charge: Refilling Lea & Perrin's bottles. Fined \$25 and costs.
- No. 1779—State of Washington v. John Bechtold. Charge: Possession filthy flour. Fined \$25 and costs.
- No. 1782—State of Washington v. J. E. Hawkins. Charge: Possession filthy flour. Fined \$25 and costs.
- No. 1785—State of Washington v. Walla Walla Meat Co. Charge: Adulterating Hamburger with Freez-em. Fined \$30 and costs.

Whatcom County.

- No.—State of Washington v. A. Stunurman. Charge: Offering for sale veal unfit for food. Fined \$25 and costs.
- No. 432—State of Washington v. Arthur Bishop. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.
- No. 431—State of Washington v. Hans Overleitner. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.
- No. 462—State of Washington v. Henry Ford. Charge: Misbranding stock feeds. Judgment suspended.
- No. 463—State of Washington v. F. J. Farley. Charge: Misbranding stock feeds. Judgment suspended.

Whitman County.

- No.—State of Washington v. Henry Behnvens. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.
- No.—State of Washington v. M. Overly. Charge: Adulterating Hamburger with Freez-em. Fined \$25 and costs.
- No.—State of Washington v. M. D. Overby. Charge: Adulterating sausage with sulphite. Fined \$25 and costs.
- No. 13157—State of Washington v. J. P. Connolly. Charge: Selling putrid canned salmon. Fined \$50 and costs.
- No. 13158—State of Washington v. J. P. Connolly. Charge: Selling putrid canned salmon. Fined \$50 and costs.
- No. 13159—State of Washington v. J. P. Connolly. Charge: Selling putrid canned salmon. Fined \$25 and costs.
- No. 13160—State of Washington v. J. P. Connolly. Charge: Selling putrid canned salmon. Fined \$25 and costs.

Yakima County.

- No. 961—State of Washington v. Richelleu Cafe. Charge: Refilling Lea & Perrin's sauce bottles. Fined \$25 and costs.
- No. 962—State of Washington v. John Keehtel. Charge: Refilling Lea & Perrin's sauce bottles. Fined \$25 and costs.
- No. 963—State of Washington v. Red Apple Cafe. Charge: Refilling Lea & Perrin's sauce bottles. Fined \$25 and costs.

Kittitas County.

- No. 170—State of Washington v. G. A. Masuda. Charge: Refilling Lea & Perrin's sauce bottles. Fined \$25 and costs.
- No. 24—State of Washington v. F. Bugin. Charge: Possession filthy flour. Fined \$25 and costs.
- No. 145—State of Washington v. Mr. Batassa. Charge: Possession filthy flour. Fined \$25 and costs.
- No. 144—State of Washington v. John Price. Charge: Possession filthy flour. Fined \$25 and costs.
- No. 143—State of Washington v. John Schoder. Charge: Possession filthy flour. Fined \$25 and costs.
- No. 25—State of Washington v. John Bordesous. Charge: Possession filthy flour. Fined \$25 and costs.

Total fines—\$3,770.

Summary by Counties:

Benton County	1	\$75 00	
Chelan County	4	100 00	
Clallam County	3	75 00	
Clarke County	5	125 00	
Cowlitz County	1	20 00	
Grays Harbor County.....	4	100 00	
Kittitas County	6	150 00	
King County	19	765 00	
Lewis County	1	25 00	
Lincoln County	2	50 00	
Jefferson County	1	25 00	
Pierce County	13	275 00	
Skagit County	13	275 00	
Snohomish County	6	715 00	
Spokane County	13	315 00	
Stevens County	2	50 00	
Thurston County	4	100 00	
Walla Walla	6	155 00	
Whatcom County	5	75 00	
Whitman County	7	225 00	
Yakima	3	75 00	\$3,770 00

Number of prosecutions made.....	119
Number cases dismissed	5
Number cases acquitted	2
Number cases forfeited bond	2
Number cases judgment suspended	2
Number cases ordered to discontinue basement bakery, no fine	1
Number cases fined	107
	119

FOOD SAMPLES ANALYZED.

KIND	Legal	Illegal	Doubtful	Totals
Cocoa	1	2	1	4
Confectionery	9	..	..	9
Corn (canned).....	4	19	..	23
Beans (canned).....	..	..	3	3
Eggs (canned).....	..	10	..	10
Eggs (fresh).....	..	48	..	48
Extracts (flavoring).....	17	39	1	57
Filth (bins, sinks, kitchens).....	..	5	..	5
Fish (except salmon).....	8	3	2	13
Flour	2	31	..	33
Fruits	6	1	..	7
Jams and jellies.....	45	1	..	46
Jelly powders	8	..	..	8
Lard	2	..	..	2
Meat	13	36	4	53
Milk (condensed).....	32	8	..	40
Miscellaneous	15	5	4	24
Peanut butter.....	4	..	..	4
Preserves	6	..	..	6
Poultry	2	5	..	7
Salmon	58	182	1	241
Soft drinks.....	25	20	23	68
Sugar	3	..	..	3
Vinegar	10	9	2	21
Totals—				
Food.....	270	424	41	735
Drugs.....	65	17	..	82
	345	441	41	817

DRUG SAMPLES ANALYZED.

	Legal	Illegal	Totals		Legal	Illegal	Totals
Alcoholic liquor.....	..	1	1	Tincture Iodine.....	8	3	11
Antikamnia tablets.....	3	..	3	Powdered licorice.....	..	1	1
Aspirin	1	..	1	Lotions	..	2	2
Barium sulphate.....	1	..	1	Lung balsam.....	1	..	1
B. K.	1	..	1	Mineral (Talcum).....	1	..	1
Bronchial troches.....	1	..	1	Olive oil.....	2	..	2
Brown mixture.....	..	1	1	Prescriptions	2	..	2
Spirits camphor.....	5	1	6	Preservatives	3	..	3
Camphorated oil.....	2	..	2	Peroxide hydrogen.....	2	..	2
Capicum (powdered).....	1	..	1	Powders	3	..	3
Citric acid.....	1	..	1	Quinine	1	..	1
Cold and grippe remedies.....	6	..	6	Salts	1	..	1
Color	..	1	1	Saltpeter	1	..	1
Copenhagen snuff.....	1	..	1	Syrup	1	..	1
Corn remedies.....	2	..	2	Tablets	2	..	2
Formaldehyde	..	1	1	Turpentine	2	..	2
Jamaica ginger.....	1	..	1	Water	1	..	1
Glycerine	3	..	3	Whiskey	..	1	1
Headache remedy.....	3	..	3	Oil of wintergreen.....	1	..	1
Hair tonic.....	1	5	6				
	33	10	43	Totals.....	32	7	39
					65	17	82

STOCK FEED SAMPLES ANALYZED.

	Legal	Illegal	Doubtful	Totals
Alfalfa feeds	2			2
Barley feeds.....	9			9
Beet pulp.....	1			1
Bran	6		1	7
Dairy feed and chop.....	7	5	3	15
Hog feed.....		1		1
Horse feed.....		1		1
Middlings	2	2	1	5
Oat feeds.....	9		1	10
Shorts	8		1	9
FEED MEALS				
Alfalfa meal.....	1			1
Cornmeal.....	3	1		4
Cottonseed meal.....			2	2
Linseed meal.....	3			3
Pig meal.....	1	1		2
Rye meal.....	3			3
Rye flour.....		2		2
Soy bean meal.....	3			3
Totals.....	58	13	9	80

POULTRY FEED SAMPLES ANALYZED.

	Legal	Illegal	Doubtful	Totals
Scratch	14	2	1	17
Corn feeds.....	2			2
Oats (ground).....	1			1
Egg foods.....	3	2	2	7
Mashes	4	7		11
Meat scrap and meal.....	2	2		4
Fish meal.....		1		1
Bone meal.....	1			1
Totals.....	27	14	3	44

Stock feeds.....	80
Poultry feeds.....	44
Total feeds.....	124
Legal	85
Illegal	27
Doubtful	12
	124

ANALYTICAL FEES FOR FERTILIZERS COLLECTED.

Aabling Boyce Seed Co., Seattle, Wash.....	\$30 00
American Minerals Producing Co., Tacoma, Wash.....	36 00
American Pacific Whaling Co., Bay City, Wash.....	18 00
Armour & Co., Spokane, Wash.....	30 00
Balfour Guthrie Co. (for U. S. Whaling Co.).....	24 00
S. Blachley, Spokane, Wash.....	24 00
Carstens Packing Co., Spokane, Wash.....	18 00
Carstens Packing Co., Tacoma, Wash.....	36 00
James Henry, Seattle, Wash.....	24 00
Jacob Kaufman, Seattle, Wash.....	18 00
Chas. H. Lilly Co., Seattle, Wash.....	186 00
Nitrate Agencies Co., Seattle, Wash.....	6 00
Nitro-Phosphate Fertilizer Co., Tacoma, Wash.....	48 00
Pacific Guano and Fertilizer Co.....	18 00
Portland Seed Co., Portland, Ore.....	144 00
Randall & McLoughlin, Seattle, Wash.....	18 00
Robinson Fisheries Co., Anacortes, Wash.....	24 00
Sea Products Co., Everett, Wash.....	24 00
Union Meat Co.....	132 00
Union Meat Co., North Portland, Ore.....	186 00
Walla Walla Meat and Cold Storage Co., Walla Walla, Wash.....	60 00
Western Fertilizer Co., San Francisco, Cal.....	18 00

\$1,122 00

FERTILIZER SAMPLES TAKEN.

	Legal	Illegal	Doubtful	Totals
Nitrate of soda.....	7	4	.....	11
Potash	8	5	.....	13
Phosphate	12	3	.....	15
Fertilizers (general).....	11	22	8	36
Bone, meat, blood meals.....	26	12	.....	38
Tankage	9	7	.....	16
Guano	9	4	.....	13
Totals.....	82	57	8	142

SUMMARY OF TOWNS INSPECTED, BY COUNTIES.

COUNTIES	INSPECTORS					
	Adams	Coffin	Collier	Gray	Henderson	Jones
Adams.....					Lind	Lind
Benton.....			Prosser			
Benton.....			Kiona			
Benton.....			Kennewick			
Benton.....			Richland			
Chelan.....		Cashmere			Peshastin	Peshastin
Chelan.....		Leavenworth			Leavenworth	Leavenworth
Chelan.....		Malaga			Cashmere	
Chelan.....		Wenatchee	Wenatchee		Wenatchee	Cashmere
Chelan.....					Monitor	Wenatchee
Chelan.....					Entiat	Monitor
Chelan.....					Lakeside	Lakeside
Chelan.....					Chelan	Chelan
Clallam.....		Neah Bay			Port Angeles	Sequim
Clallam.....		Port Angeles			Sequim	Port Angeles
Clallam.....		Sequim				
Clarke.....		Camas			Amboy	Camas
Clarke.....		Ridgefield			Brush	LaGrande
Clarke.....		Vancouver			Prairie	Vancouver
Clarke.....		Cumberland			Crawford	Washougal
Clarke.....		Washougal			Ellsworth	Felida
Clarke.....					Etna	
Clarke.....					Felida	
Clarke.....					Helson	
Clarke.....					LaCenter	
Clarke.....					LaGrande	
Clarke.....					Orchards	
Clarke.....					Ridgefield	
Clarke.....					Vancouver	
Clarke.....					Washougal	
Columbia.....		Dayton				
Cowlitz.....		Woodland			Yacolt	Kelso
Cowlitz.....					Oastlerock	Kalama
Cowlitz.....					Kelso	Oastlerock
Cowlitz.....					Kalama	
Cowlitz.....					Olequa	
Cowlitz.....					Ostrander	
Cowlitz.....					Woodland	
Douglas.....		Columbia River				
Douglas.....			Waterville		Waterville	Waterville
Douglas.....			Douglas		Douglas	Douglas
Douglas.....			Withrow		Bridgeport	Bridgeport
Douglas.....			Bridgeport		Pateros	Pateros
Douglas.....			Orondo		Orondo	Orondo
Douglas.....					Farmer	Farmer
Douglas.....					Mansfield	Mansfield
Ferry.....			Republic		Orient	Republic
Ferry.....			Malo		Boyd	Malo
Ferry.....			Curlew		Marcus	Curlew
Ferry.....			Danville		Laurier	Danville
Ferry.....			Laurier		Ferry	Orient
Ferry.....			Orient			Ferry
Ferry.....			Boyd			Boyd
Ferry.....			Ferry			
Franklin.....	Pasco		Pasco		Pasco	Pasco
Franklin.....						Connell
Garfield.....	Pomeroy					
Grant.....		Ephrata			Coulee City	Ephrata
Grant.....		Quincy				Coulee City

SUMMARY OF TOWNS INSPECTED, BY COUNTIES.—Continued.

COUNTIES	INSPECTORS					
	Adams	Coffin	Collier	Gray	Henderson	Jones
Grant.....		Trinidad			Soap Lake	Soap Lake
Grant.....		Soap Lake			Adrian	Adrian
Grant.....					Wilson Creek	Wilson Creek
Grant.....						Hartline
Grays Harbor..		Aberdeen	Aberdeen		Aberdeen	Aberdeen
Grays Harbor..		Elma	Elma		Elma	Elma
Grays Harbor..		Montesano	Montesano		Montesano	Montesano
Grays Harbor..		Westport	Westport		Westport	Westport
Grays Harbor..		Ocoosta	Ocoosta		Ocoosta	Ocoosta
Grays Harbor..		Bay City	Bay City		Bay City	Bay City
Grays Harbor..			Hoquiam		Hoquiam	Hoquiam
Grays Harbor..					Cosmopolis	
Grays Harbor..					Malone	
Grays Harbor..					Oakville	
Grays Harbor..					Porter	
Grays Harbor..					Satsop	
Jefferson.....		Ohlmacum				
Jefferson.....		Pt. Townsend				
Jefferson.....		Quilcene				
King.....	Seattle	Auburn	Barneston		Seattle	Seattle
King.....	Enumclaw	Enumclaw	Bryn Mawr		Bryn Mawr	Kent
King.....	Kent	Burton	Seattle		Renton	Auburn
King.....	Auburn	Burlington	Selleck		Enumclaw	O'Brien
King.....	Enumclaw	Barneston	Kent		Bayne	Kirkland
King.....	Des Moines	Kent	Enumclaw		Black Diamond	North Bend
King.....	Redondo	Renton	Auburn			
King.....	Zenith	Seattle			Duval	Selleck
King.....		Selleck			Falls City	Barneston
King.....		Black Diamond				
King.....		Bayne			Issaquah	Enumclaw
King.....		Kanasket			Novelty	
King.....					North Bend	
King.....					Selleck	
King.....					Snoqualmie	
King.....					Toit	
Kittitas.....	Ellensburg	Ellensburg	Thorp		Cle Elum	Roslyn
Kittitas.....	Cle Elum	Roslyn			Roslyn	Cle Elum
Kittitas.....		Cle Elum			Ellensburg	Ellensburg
Kitsap.....		Bremerton				Bremerton
Klickitat.....	Sunnydale	Bingen				Lyle
Klickitat.....		Lyle				Goldendale
Klickitat.....		White Salmon				White Salmon
Klickitat.....		Goldendale				
Lewis.....	Adna	Centralia	Centralia		Adna	Adna
Lewis.....	Chehalis	Lindberg	Chehalis		Chehalis	Chehalis
Lewis.....	Dryad	Mineral			Curtis	Curtis
Lewis.....	Doty	Morton			Dryad	Dryad
Lewis.....	Littell				Doty	Doty
Lewis.....	McCormick				Evaline	Klabe
Lewis.....	Pe Ell				Littell	Littell
Lewis.....					Napavine	Morton
Lewis.....					Pe Ell	Mineral
Lewis.....					Toledo	McCormick
Lewis.....					Vader	Lindberg
Lewis.....					Walville	Pe Ell
Lewis.....					Winlock	Walville
Lincoln.....	Davenport	Davenport		Davenport	Davenport	Davenport
Lincoln.....		Harrington		Odessa	Odessa	Harrington
Lincoln.....					Harrington	Bluestem
Lincoln.....					Creston	Odessa

SUMMARY OF TOWNS INSPECTED, BY COUNTIES.—Continued.

COUNTIES	INSPECTORS					
	Adams	Coffin	Collier	Gray	Henderson	Jones
Lincoln.....					Wilbur	Lamona
Lincoln.....					Govan	Edwall
Lincoln.....					Almira	Irby
Lincoln.....					Irby	Almira
Lincoln.....					Lamona	Waukon
Lincoln.....					Bluestem	
Lincoln.....					Waukon	
Mason.....			Shelton			
Okanogan.....			Brewster		Brewster	Brewster
Okanogan.....			Methow		Methow	Riverside
Okanogan.....			Twisp		Riverside	Twisp
Okanogan.....			Winthrop		Winthrop	Winthrop
Okanogan.....			Malott		Malott	Methow
Okanogan.....			Okanogan		Okanogan	Okanogan
Okanogan.....			Omak		Omak	Omak
Okanogan.....			Riverside		Carlton	Grand Forks
Okanogan.....			Conconully		Conconully	Conconully
Okanogan.....			Tonasasket		Tonasasket	Oroville
Okanogan.....			Oroville		Oroville	Molson
Okanogan.....			Molson		Molson	Chesaw
Okanogan.....			Chesaw		Chesaw	Carlton
Pacific.....	Raymond				Francis	Long Beach
Pacific.....	Long Beach				Globe	Holcomb
Pacific.....	Holcomb				Lebam	Lebam
Pacific.....	Lebam				Menlo	Menlo
Pacific.....	Menlo				South Bend	Willapa
Pacific.....	Willapa				Willapa	Iiwaco
Pacific.....	Iiwaco				Long Beach	Chinook
Pacific.....	Chinook				Seaview	Seaview
Pacific.....	Seaview				Iiwaco	South Bend
Pacific.....	South Bend				Chinook	
Pierce.....	Tacoma	Buckley	Lakeview		Sylvan	Tacoma
Pierce.....	Hillhurst	Orting	Tacoma		Tacoma	Alder
Pierce.....	McKenna	Tacoma	Sumner		Alder	Ashford
Pierce.....	Roy	Puyallup	Stellacoom		Alderton	Alderton
Pierce.....	Raymond	Alder	Puyallup		Burnett	Burnett
Pierce.....	Puyallup	Ashford	Gig Harbor		Buckley	Eastonville
Pierce.....		Carbonado			Carbonado	Elbe
Pierce.....		Elbe			Eatonville	Hillhurst
Pierce.....		Kapowsin			Elbe	Kapowsin
Pierce.....		National			Hillhurst	Loveland
Pierce.....		Wilkeson			Kapowsin	McMillan
Pierce.....					Loveland	McKenna
Pierce.....					McKenna	Roy
Pierce.....					McMillan	Orting
Pierce.....					Orting	Raymond
Pierce.....					Raymond	Spanaway
Pierce.....					Parkland	South Prairie
Pierce.....					Roy	
Pierce.....					Spanaway	
Pierce.....					South Prairie	
Pierce.....					Wilkeson	
Skagit.....	Sedro					
Skagit.....	Woolley	Clear Lake	Anacortes		Mt. Vernon	Anacortes
Skagit.....	Burlington	Mt. Vernon	Sedro			
Skagit.....			Woolley		Avon	Mt. Vernon
Skagit.....	Anacortes	Sedro				
Skagit.....		Woolley	Mt. Vernon			Clear Lake
Skagit.....			Burlington			Conway
Skagit.....						Burlington
Skagit.....						Sedro
Skagit.....						Woolley
Skagit.....						Stevenson
Skamania.....		Stevenson				
Skamania.....		Carson				

SUMMARY OF TOWNS INSPECTED, BY COUNTIES.—Continued.

COUNTIES	INSPECTORS					
	Adams	Coffin	Collier	Gray	Henderson	Jones
Snohomish.....	Everett	Everett	Everett	.....	Everett	Everett
Snohomish.....	Snohomish	Edmonds	Snohomish	.....	Snohomish	Snohomish
Snohomish.....	.....	.....	Arlington	.....	Arlington	Arlington
Snohomish.....	.....	.....	Marysville	.....	Stanwood	Stanwood
Snohomish.....	.....	.....	.....	.....	Silvana	Silvana
Snohomish.....	.....	.....	.....	.....	Monroe	Lake Stevens
Snohomish.....	.....	.....	.....	.....	.....	Hartford
Snohomish.....	.....	.....	.....	.....	.....	Lowell
Snohomish.....	.....	.....	.....	.....	.....	Marysville
Snohomish.....	.....	.....	.....	.....	.....	Florence
Spokane.....	Spokane	Spokane	Spokane	Spokane	Spokane	Spokane
Spokane.....	Deer Park	.....	.....	Hillyard	Springdale	Deer Park
Spokane.....	Dartford	.....	.....	Deer Park	Valleyford	Mead
Spokane.....	Dennison	.....	.....	Valleyford	Fresman	Colbert
Spokane.....	.....	.....	.....	Freeman	Rockford	Granite
Spokane.....	.....	.....	.....	Rockford	Fairfield	Chatteroy
Spokane.....	.....	.....	.....	Fairfield	Waverly	Opportunity
Spokane.....	.....	.....	.....	Waverly	Latah	Otis
Spokane.....	.....	.....	.....	Latah	Epanola	Vera
Spokane.....	.....	.....	.....	.....	.....	Hillyard
Spokane.....	.....	.....	.....	.....	.....	Dartford
Spokane.....	.....	.....	.....	.....	.....	Dennison
Stevens.....	Colville	.....	Marcus	Chewelah	Colville	Gifford
Stevens.....	Gifford	.....	Northport	Colville	Addy	Kettle Falls
Stevens.....	Kettle Falls	.....	Meyer Falls	.....	Clayton	Clayton
Stevens.....	Loon Lake	.....	Colville	.....	Northport	Springdale
Stevens.....	Grays	.....	Addy	.....	Cedonia	Chewelah
Stevens.....	Arden	.....	Chewelah	.....	.....	Loon Lake
Stevens.....	Hunters	.....	Springdale	.....	.....	Grays
Stevens.....	Fruitland	.....	Clayton	.....	.....	Arden
Stevens.....	.....	.....	.....	.....	.....	Colville
Stevens.....	.....	.....	.....	.....	.....	Fruitland
Stevens.....	.....	.....	.....	.....	.....	Hunters
Stevens.....	.....	.....	.....	.....	.....	Valley
Stevens.....	.....	.....	.....	.....	.....	Cedonia
Thurston.....	Olympia	Olympia	Olympia	Olympia	Olympia	Olympia
Thurston.....	Rainier	Tenino	.....	Bucoda	Bucoda	Rainier
Thurston.....	Yelm	Bucoda	.....	Gate	Gate	Tenino
Thurston.....	Lacey	.....	.....	Grandmound	Grandmound	Yelm
Thurston.....	.....	.....	.....	Lacey	Lacey	.....
Thurston.....	.....	.....	.....	Rainier	Rainier	.....
Thurston.....	.....	.....	.....	Tenino	Tenino	.....
Thurston.....	.....	.....	.....	Yelm	Yelm	.....
Walla Walla...	Walla Walla	Walla Walla	Walla Walla	Walla Walla	.....	.....
Whatcom.....	Bellingham	Bellingham	Bellingham	.....	Bellingham	Bellingham
Whatcom.....	Ferndale	Blaine	.....	.....	Sumas	Anacortes
Whatcom.....	Lynden	Lynden	.....	.....	Nooksack	Alger
Whatcom.....	Sumas	Sumas	.....	.....	Wahe	Conway
Whatcom.....	.....	Everson	.....	.....	Lynden	Edson
Whatcom.....	.....	.....	.....	.....	Everson	Nooksack
Whatcom.....	.....	.....	.....	.....	Ferndale	Lynden
Whatcom.....	.....	.....	.....	.....	.....	Blaine
Whatcom.....	.....	.....	.....	.....	.....	Sumas
Whatcom.....	.....	.....	.....	.....	.....	Ferndale
Whatcom.....	.....	.....	.....	.....	.....	Everson
Whitman.....	Colfax	Colfax	Colfax	Colfax	Colfax	Pullman
Whitman.....	Palouse	Garfield	Tekoa	.....	Tekoa	.....
Whitman.....	Dixie	Oakesdale	Oakesdale	.....	Oakesdale	.....
Whitman.....	Waitsburg	Pullman	Garfield	.....	Palouse	.....
Whitman.....	Pullman	Tekoa	Thornton	.....	Thornton	.....
Whitman.....	.....	.....	Palouse	.....	Steptoe	.....
Whitman.....	.....	.....	Steptoe	.....	Garfield	.....

SUMMARY OF TOWNS INSPECTED, BY COUNTIES.—Concluded.

COUNTIES	INSPECTORS					
	Adams	Coffin	Collier	Gray	Henderson	Jones
Yakima.....	Yakima	Yakima	Yakima		Parker	Selah
Yakima.....	Selah	Toppenish			Selah	Parker
Yakima.....	Parker	Wapato			Yakima	Buena
Yakima.....					Sunnyside	Yakima
Yakima.....					Granger	Granger
Yakima.....					Outlook	Sunnyside
Yakima.....					Buena	Toppenish
Yakima.....					Toppenish	Wapato
Yakima.....					Wapato	Donald
Yakima.....					Donald	Naches

Many of the towns in this list were visited several times by the respective inspectors and a number of inspections made on each visit.

**SUMMARY OF WORK ACCOMPLISHED BY THE FOURTH DIVISION OF
THE STATE DEPARTMENT OF AGRICULTURE, JULY, AUGUST,
SEPTEMBER AND OCTOBER, 1918.**

Inspections: Including foods, feeds, fertilizers, drugs and	
bakery inspections	3,347
Oil	Gallonage 6,106,517
	Fees \$12,213 86
Condemnations—	
Canned goods	Cans 10,368
Bottled goods	Bottles 270
Bulk goods	Pounds 118,073
Package goods	Packages 50 ½
Eggs	Dozen 19 ½
Drugs	Packages 9
Miscellaneous	Parcels 56
Total condemnations food and drugs.....	128,846 parcels
Towns visited	141
Samples taken	55
Prosecutions—	
Cases filed	41
Gulity	35
Forfeited bond	6 41 41
Total of fines.....	\$2,410 00

DIVISION OF OIL INSPECTIONS.

I am pleased to hand you herewith a complete tabulated statement of oil inspections for our third biennial report, dating from July 1, 1916, to June 30, 1918.

I do not know that it is necessary to preface this report with any particular introduction. The inspections have been carefully looked after and conscientiously made by each and every one engaged therein. We have had but few complaints relative to the quality of products inspected, and have had no litigation for violations of the law.

We have constantly and persistently looked into and after the matter of branding all products sent out. Each and every company has been supplied with sufficient stencils for said work. This portion of our work is of the greatest importance for the reason that under our law each and every vendor is required to sell his product at the gravity given by the state oil inspector.

We have a minimum standard for kerosene oil. We have no standard of gravity for gasoline, etc. This, however, should be corrected, and I trust we will be able to present a bill satisfactory to the legislature relative to these matters.

Attached you will find tabulated statement of all oils inspected by us for which we have received the usual legal inspection fees as fixed by the state.

We are also handing you herewith tabulated statement of the Standard Oil Company, covering the amount of gallonage inspected together with the fees thereof, for which no collections have been made.

In May, 1916, the Standard Oil Company brought suit against the State of Washington in the matter of collecting the inspection fees. This case was tried before Judge Wright in the Superior Court of Thurston County, who found for the Standard Oil Company. The case was then appealed to the Supreme Court of the state; was heard on the 14th day of February, 1917, and Judge Wright's decision reversed and the court ordered to dismiss suit. However, the Standard Oil Company, not being satisfied, appealed this case to the U. S. Supreme Court about February 23, 1917. The Standard Oil Company gave supersedeas bond for \$50,000.00. After the settlement of the case in the Superior Court the Standard Oil Company ceased to make any payments even to the registrar of the court. The matter has been pending since that time with no payments of any kind whatsoever. The case in the Supreme Court is now set for hearing on January 15, 1919.

Respectfully submitted,

S. P. WILSON,
State Oil Inspector.

SUMMARY OF OIL INSPECTIONS AND FEES.

DATE	Kerosene	Gasoline	Distillate	Naptha	Totals	Fees
1916—						
July	5,500	1,122,645	394,728	.....	1,522,873	\$3,047 04
August	5,380	769,062	356,621	.....	1,131,063	2,262 12
September	69,308	721,194	277,660	.....	1,068,162	2,136 32
October	112,218	647,302	355,207	.....	1,114,727	2,229 46
November	214,223	825,362	231,327	.....	1,270,912	2,541 81
December	144,289	581,669	156,461	.....	882,419	1,764 84
1917—						
January	180,047	577,532	207,123	Benzine	914,702	1,831 75
February	69,170	461,439	132,547	.....	663,156	1,327 81
March	45,160	571,191	319,880	.....	936,231	1,873 86
April	5,400	590,640	388,601	.....	984,641	1,909 28
May	200,167	844,698	369,547	1,150	1,415,562	2,832 73
June	3,705	828,423	216,452	2,200	943,094*	1,866 19
July	4,520	1,133,988	222,415	150	1,264,965*	2,531 35
August	13,093	929,412	268,414	2,450	1,161,833*	2,327 55
September	73,209	942,555	213,800	950	1,190,589*	2,381 61
October	129,090	1,010,600	137,442	150	1,277,282	2,555 59
November	165,049	974,661	461,443	.....	1,601,153	3,202 30
December	275,232	749,779	160,778	100	1,185,889	2,373 58
1918—						
January	40,231	603,345	200	150	643,776	1,289 67
February	220,692	951,986	271,179	.....	1,444,007	2,888 02
March .....	.....	529,309	131,520	.....	660,829	1,321 64
April	17,184	1,152,542	94,189	.....	1,263,915	2,531 89
May	82,377	1,179,644	275,743	.....	1,537,764	3,075 52
June	120,688	1,006,847	194,460	.....	1,321,993	2,645 74
	2,145,930	19,705,825	5,837,237	7,300	27,401,567	\$54,827 67

	Gals.		Gals.
* Sold out of the state.			
June	107,686	Kerosene	2,145,930
July	96,108	Gasoline	19,705,825
August	51,506	Distillate	5,837,237
September	39,425	Benzine	7,300
	294,725		27,696,392
Less amount shipped out of the state			294,725
			27,401,567

**REPORT OF OIL INSPECTIONS COVERING THE STANDARD OIL COMPANY
PRODUCTS, JULY 1, 1916, TO JUNE 30, 1918, ON WHICH
FEES HAVE NOT BEEN PAID.**

DATE	Kerosene	*Gasoline	Distillate	Naptha	Totals	Fees
Seattle						
1916—						
July	20,503	1,647,760	.....	.....	1,668,263	\$3,336 53
August	175,743	2,000,569	.....	.....	2,176,312	4,352 63
September	10,311	2,741,864	.....	.....	2,751,675	5,503 35
October	16,799	2,231,825	.....	.....	2,248,124	4,496 25
November	430,953	3,718,077	.....	.....	4,149,030	8,298 08
December	1,616,397	2,490,547	.....	.....	4,106,944	8,213 89
Total	2,270,706	14,829,642	.....	.....	17,100,348	\$34,200 71
1917—						
January	555,886	3,426,163	.....	.....	3,981,549	\$7,963 10
February	442,394	852,800	.....	.....	1,295,194	2,590 39
March	121,833	1,934,092	.....	.....	2,055,925	4,111 85
April	908,204	2,087,622	.....	.....	2,995,826	5,991 65
May	231,775	1,790,417	.....	.....	2,022,192	4,044 38
June	111,019	2,880,865	.....	.....	2,991,884	5,983 77
July	232,170	1,980,414	1,964,421	.....	4,167,005	8,334 01
August	226,701	2,569,680	593,260	.....	3,389,641	6,779 23
September .....	.....	1,280,809	1,145,684	.....	2,426,493	4,852 90
October	237,423	2,122,845	1,145,179	227,366	3,732,813	7,465 68
November	765,898	3,005,378	452,705	.....	4,223,981	8,447 96
December	706,383	2,207,395	731,793	.....	3,645,571	7,291 14
Total	4,534,186	26,138,480	6,023,042	227,366	36,923,074	\$73,846 15
1918—						
January	367,214	1,894,567	529,635	.....	2,291,416	\$4,582 83
February	369,552	1,421,392	.....	.....	1,790,944	3,581 89
March	1,354,517	7,229,458	2,030,159	.....	10,614,134	21,228 27
April	392,523	2,061,312	369,239	.....	2,763,074	5,566 15
May	52,638	1,468,084	755,216	.....	2,275,938	4,551 87
June	922,985	2,526,625	735,129	.....	3,584,739	7,769 43
Total	3,129,477	16,091,388	4,419,373	.....	23,640,243	\$47,280 43
Grand total— Seattle	9,934,369	57,059,510	10,442,420	227,366	77,663,655	\$155,327 34

DATE	Kerosene	*Gasoline	Distillate	Naptha	Totals	Fees
Tacoma						
1916—						
August	58,857	350,833	97,935	.....	507,125	\$1,014 25
September .....	.....	.....	.....	.....	.....	.....
October	6,481	199,870	.....	.....	206,351	412 70
November	179,199	379,043	93,699	.....	651,941	1,303 88
December .....	.....	361,553	.....	.....	361,553	723 11
Total	244,037	1,291,299	191,634	.....	1,726,970	\$3,453 94
1917—						
January	10,289	253,394	.....	.....	263,683	\$527 37
March	353,020	232,333	123,060	.....	708,433	1,416 87
April .....	.....	196,789	96,340	.....	293,129	586 26
May .....	.....	600,000	.....	.....	600,000	1,200 00
June	121,139	642,591	131,277	.....	895,057	1,790 01
July .....	.....	970,439	123,190	.....	1,093,679	2,187 36
August .....	.....	681,806	.....	.....	681,806	1,363 61
September .....	.....	327,777	144,643	.....	472,425	944 85
October .....	.....	.....	.....	.....	.....	.....
November .....	.....	656,733	.....	.....	656,733	1,313 47
December .....	.....	558,897	149,564	.....	708,461	1,416 92
Total	484,498	5,120,809	768,099	.....	6,373,406	\$12,746 72
Grand total— Tacoma	728,535	6,412,108	959,733	.....	8,100,376	\$16,200 66

* Includes distillate also for first twelve months recorded.

REPORT OF INSPECTIONS OF STANDARD OIL COMPANY.—Concluded.

DATE	Kerosene	Gasoline	Distillate	Naptha	Totals	Fees
Portland						
1916—						
June	10,902	91,131	16,377	2,803	121,213	\$242 42
July	19,676	75,522	36,925	20	132,143	264 28
August	18,401	100,008	55,078	5,150	178,637	357 27
September	35,689	41,137	41,221	3,769	121,816	253 63
October	40,297	38,621	6,890	2,994	88,811	177 62
November	50,900	19,830	6,882	1,922	79,534	159 07
December	38,229	34,462	14,187	300	87,168	174 34
1917—						
January	74,475	16,654	11,156	10	102,295	204 59
February	43,342	13,380	25,723		82,445	164 89
March	27,675	11,232	7,968		46,870	93 74
April	26,997	26,749	47,516	1,270	102,532	205 06
May	9,412	50,856	18,145	2,043	80,456	160 91
June	19,030	208,946	46,944	1,892	274,732	549 56
July	18,437	271,671	57,124	3,935	351,167	702 33
August	54,537	213,544	103,896	3,002	389,029	760 05
September	33,206	220,125	56,411	2,623	312,365	624 73
October	60,553	259,152	72,457	2,526	394,688	796 88
November	46,933	203,936	8,232	769	259,870	519 74
December	62,579	168,539	62,067	54	293,239	586 57
1918—						
January	74,752	168,454	27,147	70	270,423	540 85
February	32,003	94,399	27,423		153,825	307 65
March	40,523	161,346	27,166		239,035	478 07
April	33,093	254,322	75,996		368,411	736 82
May	40,276	305,173	57,566		403,015	806 03
June	26,968	290,631	77,790		395,299	790 58
Totals.....	943,835	3,342,860	966,291	85,122	5,320,108	\$10,640 18

SUMMARY.

	Kerosene	Gasoline	Distillate	Naptha	Totals	Fees
Seattle	9,934,369	57,059,510	10,442,420	227,366	77,663,665	\$155,327 34
Tacoma	723,535	6,412,106	959,733		8,100,378	16,200 66
Portland	943,835	3,342,860	966,291	85,122	5,320,108	10,640 18
Totals.....	11,606,739	66,814,476	12,400,444	262,488	91,084,139	\$182,168 18

WASHINGTON STATE FAIR.

The biennium closing October 31, 1918, marks a wonderful growth in the Washington State Fair; the two fairs held during this period having, from the point of improvements, exhibits, attractions and paid admissions, far exceeded any of the past. More interest in every way is being manifest as the fair grows and the attendance becomes more statewide, until now it cannot be truthfully said that the fair is an institution that only attracts the local people. It now compares favorably in every way with any similar institutions held in the Pacific Northwest, and in some particulars excels. While the 1917 fair exceeded any former exhibitions held upon the grounds, the 1918 fair was even larger—every department, except that of livestock, being better filled. The lack of competent help in fitting and caring for the stock, together with excessive price of feed, prevented a number of exhibitors of the Pacific Northwest, as well as some of those living in a more remote section, who were accustomed to make the fair circuit each year, from showing, and in many cases the herds have been dispersed. This being one of the results of war we may expect to see our livestock exhibits grow less each year until such a time as conditions will have become normal.

Appropriations amounting to \$58,000.00 were made for the benefit of the State Fair by the 1917 legislature as follows: Salaries and wages, \$9,120.00; operation and maintenance, \$28,880.00; construction new grandstand, \$20,000.00. The grandstand was constructed in time for use of the 1917 fair, at a cost of \$20,591.38; the additional cost in excess of the appropriation being paid from the State Fair Fund arising from the proceeds of the 1917 fair. This building was much needed and is one of the factors that served to contribute to the success of the 1917 and 1918 fairs. It has a seating capacity of approximately 4,000. Most of the old grandstand was torn down and the serviceable lumber used in the construction of the new building. One section of the old building, the newer part, however, was moved to the north of its former location and made into a bleachers with a capacity of 1,000. Notwithstanding the increased capacity provided, these buildings proved inadequate on several occasions, and an addition to the grandstand should be constructed, which could be done at a comparatively small figure.

The receipts and disbursements for the biennium are as follows:

RECEIPTS.

Balance 1915 appropriation.....	\$2,417 35	
Balance 1916 state fair.....	1,041 12	
Appropriation 1917	58,000 00	
Cash receipts 1917 (state fair fund).....	32,139 24	
Cash receipts 1918 (state fair fund).....	35,510 14	\$129,107 85

DISBURSEMENTS.

From 1915 appropriation.....	\$2,417 35	
From 1918 appropriation.....	56,046 15	
From state fair fund.....	55,683 99	104,147 49
Balance available		\$14,960.36

This balance is credited to the several funds as follows:

Operation and maintenance.....	\$53 85
Salaries and wages.....	1,900 00
State fair	13,006 51
	<u>\$14,960 36</u>

Exclusive of the grandstand, there was expended during the biennium for permanent improvements at the fair grounds \$17,801.74, made up of the following items: Extra work on grandstand, \$591.38; fencing, \$416.00; engineering for irrigation system, \$201.00; irrigation system, \$1,571.63; extending water system, \$425.23; camp grounds (clearing, grading and leveling), \$105.00; new toilets and cesspools, \$305.00; woman's building (new roof and repairs), \$744.45; electric wiring in buildings and on grounds, \$1,274.05; drinking fountains, \$42.00; moving restaurants, paddock and bleachers, \$370.00; tearing down old grandstand, \$328.75; repairing stock barns, \$150.00; clearing ground for auditorium, \$60.00; cement steps to horticultural building, \$66.60; building auditorium, \$11,105.64.

There was also expended during the same period for equipment \$2,612.34, as follows: Opera chairs and moving picture outfit, \$750.00; service car (Chevrolet), \$675.00; street sprinkler, \$627.00; gasoline engine, \$106.00; gasoline stoves and equipment for children's demonstrations, \$133.90; range and plumbing children's restaurant, \$65.44; ticket machine, \$255.00.

Six hundred eighty-five dollars fifteen cents (\$685.15) was expended for paint, lumber, hardware, plumbing supplies and small equipment. Thus making a total of \$21,099.23 which was expended directly for the betterment and equipment of the plant.

The new auditorium, which was built at a cost of \$11,105.64, is a frame building 62 feet by 100 feet, with a stage 18 feet by 40 feet, having a seating capacity of 1,200. It is completely wired and equipped for the operation of a moving picture machine and contains a complete apparatus for projecting pictures. This building fills a long felt want, and during the 1918 State Fair a continuous program consisting of lectures, educational films and demonstrations emphasizing the work of the different departments was held during each day. Each evening during the week the United States Naval Training Band from the training station at Seattle rendered concerts, which were thoroughly enjoyed by the people who filled the building to overflowing.

Twelve hundred feet of 12-inch and 675 feet of 6-inch terra cotta pipe was laid for the purpose of putting the trunk line of the irrigation system under ground, thereby greatly conserving the water. The city water system was extended by laying 568 feet of 4-inch main south to the stock barns and installing a hydrant opposite same. The system supplying the various buildings was changed by connecting same with the new pipe, giving an ample supply of water to the toilets, which, together with the seven new permanent cesspools that were also constructed, makes the grounds and buildings most sanitary. This is an improvement that was badly needed. New drinking fountains were also installed upon the grounds.

Three thousand five (3,005) feet of wood and wire fencing was built during the current year. Of this amount 405 feet was built of new material; while the remainder was reconstruction. With the exception of a small portion of fencing which will receive attention before the next fair, the grounds are now enclosed in good shape. New wire gates were also installed at the entrances.

Preliminary steps have been taken whereby the land may be made more productive, and thereby add to the fair's resources. As stated above, the irrigation water from one of the systems is now conveyed to the grounds in

an underground trunk line of 12-inch terra cotta pipe, the supplying of which, in connection with the water supplied by another irrigation company, is now ample to irrigate all of the grounds. The planting of the center field and camp grounds to some kind of a hay crop is contemplated, and a survey preparatory to supplying water to these, as well as other parts of the grounds, has already been made.

Lack of space forbids a detailed statement of the work accomplished in the several departments. However, the Children's Industrial Department should receive more than passing notice, for in this department rests to a great extent the future of the fair. The children who exhibit today will be the adult exhibitors of tomorrow, and the progress of the fair, educationally, will be governed largely by the encouragement given them in exhibiting along the lines of horticultural, agricultural, livestock, and textile pursuits. Having this thought in mind, the management is lending every encouragement possible, in keeping with the resources at hand, with the result that the interest has become so statewide that 95 children, together with their chaperons, representing 26 counties, a goodly part of them bringing their exhibits, and all of them demonstrating in the projects in which they excelled, were entertained for three days during the fair. Two large tents with cots were provided for sleeping accommodations, and the meals were served in a community dining hall under the supervision of Miss Della L. Prell, director of home economics, Washington State College. The dining room, under Miss Prell's management, was conducted to perfection. Meals were not only furnished the children, chaperons and officers directly in charge of this department, but also the fifty naval training band boys were given two meals a day for the six days of the fair. In all 1,800 meals were furnished during the week, at an expense of a fraction less than 26 cents per meal, and the fact that there was no adverse criticism is satisfactory proof that they were ample. Entertainment in the way of lectures, demonstrations, moving pictures of educational subjects, and games were provided. Mrs. Elizabeth Diets Jones, state club leader, and Miss Josephine Arnquist, assistant state club leader, ably supervised the camp, and to them and their assistants is due its success.

Notwithstanding the rapid strides the fair has made during the past few years, there is much yet to be done, especially in the way of providing suitable exhibit buildings. The poultry building is old and entirely inadequate for the purpose. The woman's building is sorely taxed, while the children's department has to be housed in a portion of the dilapidated machinery building. A new building should be provided which would take care of these two departments. The old machinery building should be demolished and a new dairy and dairy machinery building erected in its place. Until such a time as a suitable building is provided we cannot hope to have a satisfactory exhibit of dairy products—one of the greatest industries of the state. The dairy department now occupies a makeshift of a building, without any refrigeration, so wholly lacking in facilities for the purpose for which it is used and so uninviting that instead of what would otherwise be one of the largest departments from an exhibition standpoint is now the least. Premiums should also be increased and new classes added. This is particularly so in the livestock department, as well as dairy, agricultural and horticultural departments. Lack of appropriation prohibits offerings for breeds of livestock which should re-

ceive recognition of full classification in the premium list. A separate offering for poultry, as well as pet stock, should also be added in the children's industrial department.

Let us hope that the 1919 legislature will make ample appropriation for continuing the work of upbuilding the fair, so nicely begun, to the end that the various departments may be strengthened by additional premium offerings and necessary buildings erected for the accommodation of exhibits which will surely follow.

Respectfully submitted,
FRANK MEREDITH,
Secretary-Manager.

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